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ABSTRACT

This report examines the relationship between federal programs and policies and urban economic development. It provides both a conceptual analysis of the relationships and a review of the theoretical and empirical literature relevant to assessing policy effects. It is one of several in a broad study that examined federal actions in relation to aspects of the urban economic, residential, and fiscal environment. The purpose of this study is to determine capabilities for analyzing the effects of federal policies on urban areas. For analytic simplicity, the urban economy is conceived of as having three distinct but interacting sectors: the private business sector, the residential sector, and the urban public sector. This view permits consideration of the subset of federal policies that act directly on each sector, the subset of outcomes relevant to that sector, and the interactions among sectors. In this report those federal policies that directly influence economic development are discussed. Alternative definitions of "urban" are developed. Economic development variables that measure the influence of federal policies are defined. The network of relationships between policies and economic development are outlined, and federal policies are categorized according to how they influence economic development. It is indicated that summarizing the effects of the broad array of federal policies on urban economic development presented a number of difficulties. First, definitive evidence is hard to find. Second, studies have not assessed the relative importance of different federal programs. Finally, the process of economic growth and development is complex, and it is difficult to measure the relative contribution of factors that determine development. Emphasis was placed upon the shifts in economic development among three types of urban geographical units: urban areas in different regions, central cities and suburbs, and urban areas of different types.
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THE URBAN IMPACTS OF FEDERAL POLICIES: VOL. 2, ECONOMIC DEVELOPMENT

PREPARED UNDER A GRANT FROM THE CHARLES F. KETTERING FOUNDATION

ROGER J. VAUGHAN

R-2028-KF/RC
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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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PREFACE

This is one of a series of reports on a Rand Corporation study of the urban impact of federal policies. The purposes of the study as a whole are: (1) to establish a conceptual framework for assessing the effects of federal actions on urban areas, (2) to synthesize the findings of existing research regarding the effects of specific federal policies on urban economic conditions, and (3) to evaluate the adequacy of existing knowledge as a basis for anticipating the effects of future federal decisions on urban areas.

The organizing principle for this research has been to examine individually three major sectors of the urban economy that are affected by federal actions: the private business sector, the residential sector, and the local public sector. This report presents our findings about the effects of federal policies on the private business sector. The findings of our research regarding the residential and local public sectors are presented in two companion documents:

> Stephen M. Barro, *The Urban Impacts of Federal Policies: Vol. 3, Fiscal Conditions*, R-2114-KF/RC.
>
> Roger J. Vaughan and Mary E. Vogel, *The Urban Impacts of Federal Policies: Vol. 4, Population and Residential Location*, R-2205-KF/RC.

The findings of these three reports are summarized and integrated in a fourth report,

> Stephen M. Barro and Roger J. Vaughan, *The Urban Impacts of Federal Policies: Vol. 1, Overview*, R-2206-KF/RC.

The intended audience for these four reports includes federal policymakers and their staffs, state and local government officials, and others who are interested in understanding, anticipating, or influencing federal policy decisions that have consequences for urban areas. The three sectoral reports have been conceived of as resource documents that review evidence from the literature. They should also be useful to researchers in urban economics and related fields and to public and private agencies that sponsor research on urban problems. The fourth report in the series, the integrative report, is less technical and detailed than the other documents. It has been prepared to make the results of this study available to a wider audience of public officials and other persons concerned with urban affairs.

The research reported on here and in the other three documents was conducted under a grant from the Charles F. Kettering Foundation with supplementary financial support from funds provided by The Rand Corporation.

SUMMARY

This report examines the relationship between federal programs and policies and urban economic development.[1] It provides both a conceptual analysis of the relationships and a review of the theoretical and empirical literature relevant to assessing policy effects. It is one of several in a broad study that examines federal actions in relation to aspects of the urban economic, residential, and fiscal environment.[2]

The purpose of this study is to determine capabilities for analyzing the effects of federal policies on urban areas. Many of the effects are not directly caused by federal actions but are rather the inadvertent, and even undesired, side effects of policies aimed at specific social and economic goals. For analytic simplicity, the urban economy is conceived of as having three distinct but interacting sectors: (1) the private business sector, (2) the residential sector, and (3) the urban public sector. This permits consideration of the subset of federal policies that act *directly* on that sector, the subset of outcomes relevant to that sector, and the interactions among sectors. This report discusses only those federal policies that directly influence economic development.

There are several limitations on the research conducted for this report. First, no new data are presented and no new empirical analyses have been undertaken. The emphasis is on synthesizing findings from earlier work. Second, the scope of the study limits the level of disaggregation at which the influence of policies can be examined. To the extent that each urban area is unique, a study of federal policies should examine those effects for each urban area, but this report has attempted to derive general conclusions, by type of urban area. Also, rather than analyze the separate programs of each federal bureau, agency, and administration, the study has examined aspects of the private economy upon which groups of policies act. Federal policies affecting the level, growth, and distribution of demand are distinguished from those affecting the price and availability of factors of production.

THE CONCEPTUAL FRAMEWORK

First, it is necessary to develop alternative definitions of "urban" to distinguish federal actions according to whether they favor or disfavor central city areas as distinct from suburban areas, one region of the country rather than another, or urban areas of a certain type (defined by size, age, or economic structure).

Second, the economic development variables that measure the influence of federal policies must be defined. The most important variables are the level and

[1] The term "programs and policies" is used throughout this report to encompass all federal expenditures programs, taxes, subsidies, regulations, and other activities that act, directly or indirectly, on the course of economic development. It is not limited to explicit economic development programs.

[2] Roger J. Vaughan and Mary E. Vogel, *The Urban Impacts of Federal Policies: Vol. 2, Economic Development*, The Rand Corporation, R-2205-KF/RC, forthcoming; and Stephen M. Barro, *The Urban Impacts of Federal Policies: Vol. 3, Fiscal Conditions*, R-2114-KF/RC, The Rand Corporation, forthcoming.

rate of growth of employment. However, wage rates, investment, profits, and labor skill are also important.

Third, the network of relationships between policies and economic development must be outlined.

Finally, federal policies are categorized according to how they influence economic development. The most important distinction is that between policies affecting the level and distribution of the demand for goods and services and policies affecting the price and availability of factors of production.

REVIEW OF THE LITERATURE

The process of economic development is complex. Little research has been done that directly addresses how policy impinges on the development process. For these reasons the review of the literature is conducted in two stages. The first stage reviews techniques for analyzing the growth process (Sec. III) and analyzes empirical evidence concerning the factors determining economic growth (Sec. IV). The main factors include the demand or market for goods and services, including both final and intermediate markets; transportation; labor; raw materials; energy; finance; taxes and municipal services; external economies; and amenities. The second stage traces the influence of federal programs and policies through their effects on these determinants of economic development (Secs. V and VI).

TECHNIQUES FOR ANALYZING INDUSTRIAL DEVELOPMENT

Although the empirical models used to analyze growth and development appear to be very different, they are derived from the economic theory of the firm. The profit-maximizing firm determines both the level of output to produce and the production process to use in response to the market demand for its output and to the price and availability of productive factors. From this simple theory two types of models have been derived: those that attempt to explain the *growth* of employment in a given area and those that attempt to explain the *location* or *distribution* of employment within a given area. The latter approach is based upon the theory of the location of the firm in which demand, production costs, or both vary spatially.

In the factor supply model, a region is assumed to face an infinitely elastic demand curve for its output. The region will grow only through increases in the supply of factors of production. The model emphasizes the importance to regional development of attracting capital and labor and permits the estimation of their relative contributions to increases in output. The role of demand is ignored.

The second type of growth model focuses upon the role of an increase in demand in stimulating growth. Factors of production are assumed to be in infinitely elastic supply in the region, which will grow in response to an increase in demand for its output. The increases may be the result of the rest of the nation's purchasing more of the region's output, or they may be from a growth in public expenditures on goods or construction. Increases in demand lead to higher employment in the export sector and ultimately to increased demand in other sectors through the local multiplier effect.

A number of econometric models introduce supply and demand simultaneously to estimate the interactions between the growth of factors of production and the growth of demand. These models may be regarded as a synthesis of supply and demand models. They offer the additional value that they can estimate the relative contribution of supply and demand to the growth process.

Both supply and demand models can be used to explain interregional differences in growth rates. However, none of the models outlined above, in their simplest form, are concerned primarily with patterns of location.

The basic form of the neoclassical location theory of the firm is of a company maximizing profits that, at any location, are the difference between revenue and costs.

The pure theory of location has produced a number of empirical techniques that may be divided into those that focus upon supply—particularly the spatial structure of factor costs, including land prices—those that focus upon demand, and those that attempt to include both. However, the location theory of the firm has very little to say about changes in the level of output over time.

Perhaps the most important conclusion of the review of growth and location models is that no one model includes all the elements necessary to perform an analysis of the effects of federal policies on industrial development. Each type of analytic technique emphasizes one aspect of the growth or location process. The absence of a satisfactory model is due partly to the lack of data for many of the factors one would expect to influence the course of local economic development and partly to the complexity of the growth and location processes themselves.

The analysis of factors affecting industrial location and development must draw upon the results of studies using many different techniques. This makes it difficult to weigh the relative importance of individual factors of production, since their roles have been identified through different models.

FACTORS AFFECTING ECONOMIC DEVELOPMENT

A review of empirical studies of the process of development yields some general conclusions regarding factors that have led to the slow growth of cities relative to suburbs, and to different growth rates among regions. First, many things affect industrial behavior and in many diverse ways. Second, measurement problems and interaction effects make it analytically difficult to separate the influence of individual components. However, some consensus does emerge. The major factors that have affected the growth and location of employment are shifts in the distribution of population and spatial differences in the prices and availability of transportation, labor, land, energy, raw materials, and local taxes and services.

Movements in population may have been the single most important explanation of differences in the growth of employment opportunities among regions. There has been a pronounced movement of the population toward sunbelt states in the South and West. To some extent, people have followed jobs; but there is some evidence that employment growth has followed population growth more strongly than vice versa. The most rapid growth in nonagricultural employment has typically been in areas where population had been growing most rapidly and whose share of the nation's nonagricultural employment was less than the share of the nation's population. *However, it is difficult to determine whether the influence of population oper-*

ates primarily through increasing the local supply of labor or through increasing the local level of demand for goods and services.

The movement of population may have affected the shift of employment from city to suburb as strongly as it has the shift between regions. The movement of households to suburban areas has been in response to improved transportation systems, the pursuit of a more attractive living environment, rising incomes, and the desire for more residential space.

The extension of the interstate highway system and the growth of trucking have opened up to industrial development many regions where prohibitive transportation costs had previously stifled development. Highway-oriented new towns have grown at the expense of railway-oriented cities in the Northeast. Private automobiles, congestion in the central city, and commuter highway systems have encouraged the suburbanization of population. Increased use of truck transportation, together with the emphasis on single-story, linear-flow manufacturing plants, has also encouraged the relocation of manufacturing jobs in suburban locations.

Labor priced low relative to its productivity has been an attraction in growth regions. Industry has moved to regions where labor productivity relative to wages is highest. High-skill, high-income labor has located in the suburbs, which may have attracted some industry from the central city. There is no evidence concerning the roles of unionization and affirmative action hiring procedures in this process. The presence of a large pool of low-skill labor in central cities is attractive to some labor-intensive manufacturing firms.

The development of single floor production techniques, together with increased reliance on trucking, may have encouraged some firms to seek locations in growth areas where land is cheap. However there is little evidence concerning the relative strength of this influence. Truck transportation may have encouraged land-intensive plant designs, leading firms to seek suburban locations where large lots may be purchased easily and cheaply.

The high cost of energy in the Northeast may have contributed toward the slow growth of some industries in that region. The necessity to locate near raw materials has become less important as the share of raw materials in total production costs has declined. Industries have been able to move away from regions where raw materials are located and into growth regions.

There is no substantial evidence that local taxes are important in the relocation or growth performance of industries. However, the quality of local services may play a role, especially in the suburbanization process.

Finally, a number of other factors may have played a role in shaping economic development patterns, but empirical evidence is slight. The availability and cost of loans appear to vary between regions. They may be especially important to small firms that must rely on local bank loans as a source of funds. The importance of external economies—economies of scale and agglomeration—in preserving the advantage of established cities is uncertain. Some industries may need to locate in large and diverse urban economies, although the rapid improvement in communication may have eroded the importance of spatial proximity. Finally, civic leadership, the ability to formulate far-sighted policies and to grasp opportunities, although difficult to quantify, may play a decisive if ill-defined role in economic development.

EFFECTS OF FEDERAL POLICIES ON URBAN ECONOMIC DEVELOPMENT

Summarizing the effects of the broad array of federal policies on urban economic development presents a number of difficulties. First, definitive evidence is hard to find. Second, studies have not assessed the relative importance of different federal programs and policies or how such policies may act together to create an effect that is greater than the sum of the parts. Finally, the process of economic growth and development is complex, and it is difficult to measure the relative contribution of factors that determine development.

The changing patterns of economic development discussed in this report are the result of a number of broad influences within which federal economic policies have played a fairly small role. Technological change and population movements have played the decisive parts. Many federal policies that have created the strongest incentives for geographic changes are irreversible: Highways cannot easily be torn up, nor waterways filled in. Economic programs and policies are identified that could conceivably be reversed to benefit cities that have suffered from the inadvertent effects of past policies. This does not imply a judgment that such a reversal would be desirable. Rather, it is an attempt to identify the "degrees of freedom" possessed by the federal government in the design and development of an urban policy.

Emphasis is placed upon the shifts in economic development among three types of urban geographical units: urban areas in different regions, central cities and suburbs, and urban areas of different types. Table S.1 identifies the differential effects among these geographical units of federal policies affecting the distribution of demand, and Table S.2 summarizes the effects of those policies that influence the price and availability of factors of production.

REGIONAL SHIFTS

There is considerable disparity in employment growth rates among regions. Urban areas in slow growing regions have often experienced actual declines in employment. The Northeast and the Midwest have grown slowly since World War II; the South, the Mountain region, and the West have grown faster. These changes have tended to reduce regional inequalities in the distribution of employment, per capita income, and the incidence of poverty. The Northeast and Midwest still lead the nation in employment opportunities and median household income and have smaller percentages of their populations below the poverty level than other regions.

The South has benefited from a number of technological changes. First, the increasing specialization in manufacturing has reduced the share of raw materials in total costs to such an extent that many industries are able to grow in areas away from sources of raw materials—particularly coal and iron ore—without incurring high transportation costs. This process has drawn manufacturing away from the old manufacturing belt in the Northeast and Midwest. Second, the increasing importance of truck transportation has allowed firms to locate away from established rail networks. Third, the development of linear flow plants, encouraged by the

Table S.1

THE URBAN EFFECTS OF FEDERAL POLICIES ON THE DEMAND FOR GOODS AND SERVICES

Federal Policy	Interregional Effects	Intraregional Effects	Effects by Type of Urban Area
Macroeconomic Policies			
Aggregate monetary and fiscal policies	Northeast conforms more closely to national cycles, grows more slowly, and responds more volatilely than other regions to aggregate national changes	Central cities appear to be more cyclically volatile than suburbs, and suffer recessions more deeply	• Urban areas with high employment concentration in durable goods industries experience volatile employment fluctuations • Large urban areas conform more closely to the nation than small ones • Large cities experience more rapid inflation than small ones
Automatic fiscal stabilizers	Unknown	Unknown	Unknown
Personal income tax changes	Favor high income regions	Favors high income suburbs	Unknown
Corporation income tax changes	Slight favor to growth regions	Unknown	Unknown
Investment tax credits	Favor growth regions	Favor growth suburbs	Unknown
Public works programs	Favor growth regions	Favor suburbs	Unknown
Public employment programs	Unknown	Favor central cities	Program grants have been concentrated in large cities
Federal Spending and Purchasing			
Aggregate tax and expenditure patterns	Favor low income regions at the expense of the Northeast. Tax receipts fall short of expenditures in growth regions	Expenditures are concentrated in central cities	Unknown
Defense contracts	New England and Pacific areas have benefited from high federal expenditures	Unknown	Unknown
Defense salaries	Concentrated in the South and West	Unknown	Unknown
Sewage and water treatment facilities	Unknown	Have aided suburban development	Unknown
Federal Transfer Payments	Have stimulated redistribution from rich to poor regions. Northeast receives higher per capita welfare payments than elsewhere • Retirement payments have benefited the sunbelt	Unknown	Unknown

Table S.2

The Urban Effects of Federal Policies on Price and Availability of Factors of Production

Federal Policy	Interregional Effects	Intraregional Effects	Effects by Type of Urban Area
Labor			
Income redistribution and taxes	High unemployment and welfare payments in the Northeast may have led to a reduction in labor force participation and higher unemployment in that region	Unknown	Unknown
Minimum wage	Unknown	May have led to increased unemployment in central cities in which affected labor is concentrated	Unknown
Unionization	High membership rate in Northeast has resulted in higher wages which may have slowed growth	Unknown	Unknown
OSHA	Affects regions according to industrial structure (results unknown)	Unknown	May affect older cities more severely
Manpower programs	Unknown	Tend to benefit central city labor force	Unknown
Transportation			
Regulation	• Increase in freight rates has encouraged decentralization • Rail based industries in Northeast have suffered with the rise of trucking	Rail based central city industries have suffered with the increase in trucking, which encourages surburbanization	Cross subsidy from large to small towns
Subsidies: Highways	• Have favored growth regions at the expense of Northeast • Subsidy in construction from North to South and Mountain area	Favored suburbs	Favored poorer, smaller towns at the expense of large towns.
Waterways	• Recent developments may have favored the South • Have diverted trade-offs from rail	Unknown	Cities served by waterway systems have benefited at the expense of railroad based cities
Mass transit	Unknown	May encourage suburbanization of population	Small cities receive higher per rider subsidy
Rail	May favor Northeast in the future	May favor central cities	May favor large cities
Air	Unknown	Airports usually constructed in suburbs	Cross subsidy from large to small cities
Energy			
Regulation	Natural gas regulation has deprived the Northeast of gas supplies	Unknown	Unknown
Subsidies	Unknown	Unknown	Subsidies for rural electrification may encourage decentralization
Capital			
Tax structure	Unknown	Tax structure may have encouraged decentralization	Unknown
Regulation	Unknown	Pollution control may affect central cities more reversely	Pollution control may affect older cities more severely
Subsidies: Business loans	Unknown	May encourage central city investment	Unknown

steady decline in real energy costs (until recently) and industrial air conditioning has led to the construction of modern manufacturing plants in the South.

Population movement toward the South and West has been paralleled by the movement of jobs.[3] Population movements have probably preceded job movements. The distribution of nonagricultural jobs among regions is closer to the distribution of population now than at any other time in this century. Movements in population and technological change probably explain the major part of interregional differences in employment growth.

A number of past federal actions that cannot be reversed have played some part in shaping interregional patterns of growth. Federal construction activities are the major set of policies in this category. For example, the interstate highway system, although involving only a small net federal subsidy, has had substantial interarea subsidies and has led to the construction of highways in the South and Mountain areas that would not have been carried out in the absence of the program. Firms relying on truck transportation have been able to locate in these areas. The construction and operation of inland waterway systems have also encouraged development, particularly in the South Central region.

There are a number of important reversible interregional policy effects. Macroeconomic policies that influence the national growth rate have affected regions differently. Urban areas in the old manufacturing belt (the New England, Middle Atlantic, and East North Central census divisions) closely follow changes in the national economy because of the diversity of their economic bases and their concentration in cyclically volatile durable goods industries. The slow rate of growth in the national economy has had a particularly severe effect in Northeastern cities. However, these areas are also quite responsive to improvements in the national growth rate; during any economic recovery, they will tend to expand more rapidly than other areas.

Monetary and fiscal stabilization instruments have failed to help the Northeastern region. For example, investment tax credits benefit growth regions—the South and the West—where a disproportionately large share of the nation's investment is made. However, variations in personal income tax rates favor the Northeast because of its high per capita income. The overall pattern of federal expenditure has also operated against the old manufacturing belt. This area has received a much lower per capita volume of construction and defense expenditures than other places.

Income redistribution programs have transferred resources from the Northeast to the South. In view of the purpose of the program, this is to be expected.

Federal regulation of freight rates has stimulated the expansion of trucking at the expense of railroads, which has worked against the rail based industries in the Northeast. It has also raised the average cost of transportation, particularly long haul transportation, which encourages firms to relocate nearer to their markets and therefore accelerates regional decentralization.

Federal policies have also influenced the labor market. However, although the influences are probably extensive, they are complex and the ultimate outcomes difficult to assess. Regional variations in unemployment insurance benefits and in

[3] The federal role in determining population movements is discussed in the *Population and Residential Location* report.

welfare payments have probably led to an increase in the wages but a decline in the availability of unskilled labor in the Northeast where these benefits are highest. The high rate of unionization in the Northeast, encouraged, in part, by federal labor relations legislation, appears to have led to higher wages and may have encouraged firms to seek lower cost, nonunionized labor in the South.

The regulation of natural gas prices has led to a sharp curtailment in its availability to commercial users outside producing states. Energy costs in the Northeast are substantially above costs in other regions.

Regional shifts may be slowing. Regional differences in wages and productivity are narrowing, and the interstate highway system is substantially completed. These are weak signs that regional differences in employment growth may decline.

In summary, the relatively rapid growth in areas outside the Northeast and Midwest appears to be the result of underlying social and economic changes, although it has been augmented by a number of federal policies. The most important federal influence has been through the construction of national transportation networks, which cannot be reversed. Among federal policies that have exerted regional biases but could be reversed if it were desired to assist in the economic recovery of the Northeast, the most important are the distribution of federal expenditures and the regulation of transportation and energy prices.

CENTRAL CITY VERSUS SUBURB

Employment in suburban areas has grown faster than employment in central cities in all regions. Again, it is possible to identify a number of factors that have led to this trend.

The development of land-intensive linear flow plants and the growing importance of truck transportation have led a number of industries to seek suburban locations near convenient highway access. The increased reliance on the private automobile has allowed firms to move away from the central foci of public transportation systems without reducing the numbers of workers upon whom they can draw.

The share of the urban population located in suburban areas has dramatically increased, particularly among higher income households. Federal policies have played a significant role in this process, for example, through subsidies to home ownership and highway construction. There is some evidence that the growth of high income population in suburban areas may have attracted firms seeking skilled labor.

Construction of the interstate system has encouraged the suburbanization of both firms and population and has probably been the major federal influence on the process. In addition, a number of public construction programs, including water and waste treatment plants, have favored suburban areas.

Suburbs seem much less prone to cyclical fluctuations in employment than central cities. As a result, central cities have benefited from some stabilization policies. Unemployment insurance and public employment programs have been concentrated in central cities. However, public works projects for countercyclical purposes have probably been carried out in suburban areas. The direct benefits of temporary reductions in personal income tax rates have also been concentrated in suburbs where the average tax rate is higher.

Of policies that affect the price and availability of factors of production, transportation policies dominate in the process of suburbanization as they have for regional shifts. Commuters using automobiles have been able to move further from the city center. Increased traffic congestion may have encouraged firms to move away from the cities. The shift from rail to trucking, encouraged by federal regulatory and subsidy policies, has hastened this process. Federal programs that have raised the cost of low-skilled workers relative to higher-skilled workers—including minimum wage legislation and welfare payments—may have encouraged firms to emphasize high-skill production methods, which may have encouraged a movement to suburbs where skilled workers are located. The business tax structure may encourage firms to hold land for speculative reasons. Large lots suitable for this type of investment are more readily available at the suburban fringe than at the city center. Finally, the quality of local public services and the level of local taxes may have played a role in encouraging the suburbanization of employment, although there is little direct evidence. The local public sector appears to exert its influence primarily through its effects on residential location rather than directly on businesses.

TYPES OF URBAN AREAS

Less is known concerning the causes for different patterns of economic development by type of urban area. Overall, large cities seem to have grown more slowly than smaller cities. New cities appear to have grown faster than older cities. However, these categories may be related to regional location rather than city type—large cities tend to be older cities located in the Northeast. Older cities, particularly large, densely populated ones, have suffered with the decline of rail freight transportation since their spatial configuration makes it difficult for them to adapt to increased trucking. Their manufacturing plants are ill-equipped for adaptation to the land-intensive demands of modern plants.

Movement away from larger, older cities toward smaller and less densely populated urban areas, perhaps in response to the quality of the environment, may have driven up wages in older cities as workers demand compensation for the unpleasant aspects of urban living. Some policies have influenced different types of cities in different ways. Small areas have benefited at the expense of large areas in a number of ways: Public works projects, particularly sewage and water facilities, have been concentrated in rural areas; freight rate regulation has subsidized routes to small areas at the expense of more densely used routes to larger cities; federal subsidies have resulted in the construction of roads and airports in small areas where they would not otherwise have been built; rural electrification loans have reduced the cost of power; and mass transit grants per rider are larger for smaller cities. The development of a full taxonomy of effects by type of area must await the results of future research.

RESEARCH AGENDA

The major recommendation for future research is that data for the analysis of urban economic development be improved. Four types of data should be assembled on a regular basis:

- The geographical distribution of federal expenditure by program.
- Urban economic development data. Employment, output, and factor requirements of industries in cities, suburbs, and nonmetropolitan areas need to be compiled. Gaps and inconsistences in present data sets should be reduced.
- Industry surveys. A sample of firms should be surveyed regularly to provide more detailed data than are available in present economic censuses.
- Factor supply data. Information on the cost and availability of factors of production should be compiled for a sample of cities.

These data should provide the basis for further research concerning the relationship between federal policies and urban economic development. Among the most important issues meriting further research are: (1) the complex relationship over time of intraregional movements of population and employment; (2) the relationship among local taxes, public services, and economic development; (3) interarea and intra-area patterns of investment; and (4) changes in energy prices.

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The advisory group consisted of:[2]

Mr. Carl Basnett
Office of the Mayor
Atlanta, Georgia

Dr. Herrington Bryce
Joint Center for Political Studies

Mr. Robert Cauthorn
Councilman
Tuscon, Arizona

Dr. Timothy Connor
Director, Office of Income Security
U.S. Department of Health,
Education, and Welfare

Mr. Mike Garn
Director, Urban Development
The Urban Institute

Mr. Clifford Graves
Deputy Associate Director
for Evaluation and Program
Implementation
Office of Management and Budget

Mr. James King
Assistant City Manager
San Jose, California

Honorable Phillis Lamphere
Councilwoman
Seattle, Washington

Honorable Moon Landrieu
Mayor
New Orleans, Louisiana

Mr. Mike Schneider
Office of Policy Development
and Research
U.S. Department of Housing
and Urban Development

Commissioner Patricia Sheehan
Department of Community Affairs
Trenton, New Jersey

Mr. William Slayton
Executive Vice President
American Institute of Architects

Mr. Richard Walsh
Acting Director for Transportation
and Policy Development
U.S. Department of Transportation

[1] The research is reported in Roger J. Vaughan, *The Use of Public Works as a Countercyclical Device*, The Rand Corporation, R-1990-EDA, June 1976; and Georges Vernez et al., *Regional Cycles and Employment Effects of Public Works Investments*, The Rand Corporation, R-2052-EDA, January 1977.

[2] The positions held by the Advisory Group are those held during 1973 and not necessarily their current positions.

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I. INTRODUCTION

During the recession of 1975, many urban areas experienced rates of unemployment considerably above the national average, drawing attention to the problem of their slow rate of economic development. The high national rate of employment growth before 1969 was accompanied by a positive expansion in the number of jobs in large cities, but the slower national growth rate since then has meant that many cities—particularly large, older cities in the Northeast—have experienced a net loss of jobs. There is increasing awareness of the interconnections in the industrial, residential, and public sectors of the urban economy: Job losses are both causes and consequences of fiscal problems, outmigration, and other components of urban decline.

The importance of the federal government's influence on urban affairs has long been recognized, but perceptions of that role have changed in the last decade. Formerly, emphasis was placed on direct federal urban programs, such as Urban Renewal and Model Cities, and on federal social programs aimed at the major urban ills of poverty, bad housing, and inadequate education. Now the proposition is gaining acceptance that these direct programs are less important to the cities than a much broader array of federal programs and policies that affect urban areas indirectly by altering the economic and demographic environment.[1] It has become customary to speak of an "implicit," or "hidden," urban policy in referring to the whole set of federal actions that have affected cities, often detrimentally, during the postwar years. However, understanding of how this implicit urban policy operates is limited. In their 1976 annual report, the Joint Economic Committee of Congress noted that there was a lack of solid statistical information about the effects of federal tax, expenditure, credit, and employment policies on business decisions to relocate.

This report examines the relationships between federal programs and policies and economic development in urban areas. It covers programs that affect the demand for local goods and services—macroeconomic policies, federal purchases of goods and services—and programs that affect the local economic environment through supply conditions—transportation facilities, the labor market, and local tax rates and public services. It provides both a conceptual analysis and a review of the theoretical and empirical literature. It attempts both to summarize what is known about these federal-local relationships and to identify major gaps in existing knowledge.

THE URBAN IMPACT STUDY

The main purpose of the urban impact study is to determine the current capabilities for analyzing the effects of federal policy on urban areas and what additional capabilities need to be developed. It was first necessary to analyze the

[1] The term "programs and policies" is used throughout this report to encompass all federal expenditure programs, taxes, subsidies, regulations, and other activities that directly or indirectly affect the course of economic development. It is not limited to explicit economic development programs.

ways federal actions impinge upon urban conditions; second, selected portions of the literature in urban economics and related fields were reviewed. The conceptual analysis provides an overview of the linkages between federal policies and urban outcomes and a basis for deciding what empirical information is needed to assess them. The literature review investigates the existing knowledge of each link in the urban network to determine the adequacy of assessment techniques.

Many types of federal policies and many different urban outcomes need to be considered. Some of the important relationships between federal policies and effects on cities are indirect. Typically, there are multiple channels of federal influence on particular urban outcomes and multiple links in the causal chains between policies and effects. The complexity of the problem makes it infeasible to analyze either the full range of urban outcomes or the full array of federal policies simultaneously. Therefore, the problem was subdivided to establish a manageable research design.

The urban economy, as investigated in this study, consists of three distinct but interacting sectors: (1) the private business sector, (2) the residential or household sector, and (3) the urban public sector. The three main substantive reports of the study correspond to these three sectors. The effects of federal policy on activity in The urban public sector are discussed in *The Urban Impacts of Federal Policies: Vol. 3, Fiscal Conditions*, by Stephen M. Barro (the report is hereafter referred to as *Fiscal Conditions*); federal influences on urban residential patterns and other behavior of the household sector are discussed in *The Urban Impacts of Federal Policies: Vol. 4, Population and Residential Location*, by Roger J. Vaughan et al. (*Population and Residential Location*); and the influence of federal actions on the urban business sector are analyzed in this report. The main findings from all three documents will be combined into an "integrative" report, *The Urban Impacts of Federal Policies: Vol. 1, An Overview*, which, among other things, will examine the linkages among the three sectors of the urban system.

The advantage of subdividing the subject matter into these three parts is that a subset of urban outcomes and a subset of federal policies may be considered at one time. The examination of federal effects on the business sector, for example, is concerned with such outcomes as levels of employment, output, and investment in urban areas. In the residential or household sector, outcomes include the size, composition, and spatial distribution of the population in urban areas, and the quantity and quality of the housing stock. In the urban public sector, the major outcomes are the level and mix of public services and the levels of tax burdens imposed upon residents. The study plan permits each set of outcomes to be examined in detail in a separate report. Equally important, most federal programs and policies can be classified according to the sector in which they have their initial, or direct, effects. Federal aid to state and local governments has its initial effects in the urban public sector; federal subsidies and tax deductions for housing consumption in the residential or household sector; and federal economic development programs, business taxes, and regulatory policies in the private business sector. Therefore, the analysis begins by concentrating on the set of federal policies that affects the sector directly. The separate results can then be brought together for the analysis of the more complicated chains of influence that cross sector lines.

Some federal policies initially affect one of the three sectors but then have indirect effects on one or both of the remaining parts of the system. The following indirect effects are extensively discussed in the urban literature:

1. Policies aimed at the household sector that substantially influence residential location patterns (e.g., federal programs of housing assistance and highway construction) are likely to affect business location patterns as well. Businesses tend to follow labor supplies and markets and respond to population shifts.[2]
2. Policies that initially affect the business sector by altering the relative attractiveness of urban and suburban or northern and southern locations (e.g., federal energy policies, regulation of freight transportation, and locational tax incentives) are likely to have indirect effects on the urban public sector. Shifts in business activity cause changes in the relative size or rates of growth of tax bases in each area and thereby in their ability to support local public services.
3. Policies that initially affect the urban public sector (e.g., federal financial aid to local governments or federal assumption of responsibility for formerly local services) are likely to affect both the business and residential sectors indirectly. The locational decisions of both firms and households are determined in part by the combinations of public services and tax rates offered in each area.[3]

In each of these examples, a federal action has a direct effect in one of the three sectors; the altered conditions in that sector then exert secondary effects on one or both of the other sectors. An understanding of federal policy influences on developments in any one sector, therefore, requires not only the federal actions that affect the sector directly but the federally induced developments in the other sectors that may have repercussions in the sector being examined.

This view of the urban system has two implications for the organization of this report. One is that the discussion of federal influence in the business sector must consider both the actions that impinge directly upon the economic environment and the indirect consequences of actions that have their initial effects on local fiscal and population outcomes. The second implication is that it is not necessary to consider the details of federal policies that indirectly affect the business sector; it is sufficient to look at the intersectoral connections among outcome variables. To illustrate, an essential part of the analysis of federal influences on urban economic development is how federal taxes affect the supply of labor. The labor supply in an urban area depends on outcome variables in both the public and household sectors—the level of local taxes and public services in the first instance and the characteristics of the population in the second. Federal tax policies that affect the level of local taxes or local residential patterns can be thought of as having indirect effects on the course of economic development.[4] However, policies that impinge initially on the local public and residential sectors will be examined in the *Fiscal Conditions* and *Population and Residential Location* reports. Here, it is taken as given that a variety of

[2] The interaction between residential location and employment location is discussed in Sec. IV of this report and more fully in Sec. III of the *Population and Residential Location* report.

[3] The effects of changes in local taxes and public services on business location are discussed in Sec. IV of this report; their influence on residential location is discussed in Sec. VIII of the *Population and Residential Location* report.

[4] For example, federal tax laws permit tax-free municipal bonds, which enhance the ability of local governments to raise loans, and deduction of mortgage interest payments against personal income tax. These policies affect the level and the characteristics of the local population from which the labor force must be drawn.

federal policies do influence the local public and residential sectors. It is then possible to move directly to the issue of how changes in these sectors affect the course of local economic developments. This division of effort eliminates the need to review the whole list of federal policies that initially impinge on the public and residential sectors and then have indirect economic development implications. The price of these economies, however, is that this report (and each of the companion reports) is not complete in itself. To obtain a full picture of the network of federal policy effects, one must consider the three reports together. The integrative report will bring together the various parts of the story and present an overview of the main intersectoral connections.

SCOPE OF THIS REPORT

Three kinds of stimuli affect urban economic development:

1. FEDERAL PROGRAMS AND POLICIES THAT IMPINGE DIRECTLY UPON THE LEVEL OF DEMAND FOR GOODS AND SERVICES. The main activities that fall under this heading are fiscal policy, monetary policy, federal purchases of goods and services, and income transfer payments.
2. FEDERAL PROGRAMS AND POLICIES THAT AFFECT THE PRICE AND AVAILABILITY OF PRODUCTIVE INPUTS. This category includes regulations and programs that affect the price and skill level of the labor force, determine the availability of transportation services, regulate the way output is produced, and affect the local business climate in other ways.
3. FEDERALLY INDUCED CHANGES IN PUBLIC SECTOR ACTIVITY AND IN URBAN POPULATION AND HOUSING PATTERNS THAT HAVE IMPLICATIONS FOR ECONOMIC DEVELOPMENT. The main categories of such changes are those that affect the local demand for goods, the local supply of labor, or the availability of local public services.

The specific federal policies that generate the changes referred to under item 3 are summarized briefly in the second section of this report, but the detailed discussions of the effects of those policies are presented in the *Fiscal Conditions* and *Population and Residential Location* reports.

The objectives of this report are implicit in what has already been said about the Urban Impact study. The first is to provide a conceptual framework and the second is to summarize existing research findings about the effects of federal actions on conditions facing the urban business sector and the responses of the sector. Little research deals directly with the topic, and therefore this analysis is performed in two stages:

1. The role of demand and of the price and availability of productive factors on the growth, development, and location of industry are reviewed. These factors include labor, transportation, capital, land, local public services, and amenities.
2. The effects of federal actions upon these factors are assessed.

The third objective of this study is to identify major substantive and methodological gaps in the research and to make recommendations about future priorities.

Section II presents the conceptual framework portion of this study. It is primarily a logical exercise and is intended to provide both a frame of reference within which the literature on urban economic development can be organized and evaluated and a basis for judging what information is needed for policymaking—therefore, what research remains to be done.

The framework portion of the effort can be thought of as addressing four issues: First, a number of alternative definitions of "urban" are developed to be able to make distinctions concerning policy effects. Do the results of federal actions favor or disfavor central city areas as distinct from suburban areas, cities in one region of the country rather than elsewhere, or cities of a certain type (defined by size or economic base)?

Second, the variables that measure the course of urban economic development are defined. The most important of these are levels and growth rates of employment, wages, output, investment, and the relocation patterns of businesses.

Third, the network of relationships between federal policies and urban economic development outcomes is conceptualized. This, the heart of the framework, is based on a general model of the determinants of the course of local economic development. This model has been developed primarily to permit a systematic survey of the many linkages among federal policies, economic outcomes, and a host of intermediate variables.

Fourth, relevant federal policies and programs are categorized. For the purposes of this study, it is important to group federal activities according to how they affect urban economic development (e.g., by modifying the demand for locally produced goods and services or by influencing production costs). However, it is also useful to distinguish among different modes of federal action—such as direct purchases, transfer payments, and regulation—and among policies with direct and indirect and long-term and short-term effects.

The literature review portion of the study covers theoretical and empirical studies of the economics of industrial growth and development. As well as summarizing what is known concerning the factors that affect industrial growth and development, and the influence of federal policies upon these factors, the techniques used to analyze local economic growth and development have also been reviewed. This review covers neoclassical economic growth models, cross-sectional studies of regions or cities, time series analyses of individual cities, and surveys of individual firms. The question emphasized most is the potential usefulness of analytic models and methods for carrying out policy analyses of the effects of federal policies on urban economic development. The review also summarizes the state of the art in each field, but only secondary attention is given to the detailed methodological issues that are often emphasized in research reviews, except where those issues are crucial to the usefulness of the work for policy analysis.

The approach to identifying gaps in the ability to assess the effects of federal policies on urban economic development is to compare the results of the conceptual framework and the literature review portions of the study. The conceptual model implies that information is needed about linkages among certain sets of variables to permit estimation of federal effects. The literature review makes it possible to determine which of the needed pieces of information are actually available. Comparison of the necessary information with the information that research has actually produced permits identification of the major knowledge gaps.

To translate findings about information gaps into recommendations about research priorities (a research agenda), three additional steps are needed. One is diagnosis. Is there an information gap because theory or methodology is inadequate, because data do not exist, or simply because the area has been neglected? The second step is evaluation of research cost and feasibility. What will it take to fill the gap? The third and most difficult step is deciding on the relative values of different kinds of additional knowledge. It has not been possible within the resources available for this study to assign to these issues the time and resources that they deserve. However, a rough initial attempt has been made that involves assessing research opportunities and concentrating on a few of the most critical gaps.

LIMITATIONS

There are several important limitations on the subject matter covered by this report and, more particularly, on the material covered in the literature review. These reflect both the resource limitations of the study and the division of effort among the three reports. Additional and more specific limitations of the analysis are discussed in the following sections.

First, the research conducted under this study consists strictly of secondary and tertiary analysis of existing data and urban models. No new data are presented and no new empirical analyses of previously collected data are undertaken. The emphasis is on synthesizing findings from earlier work, reporting on the state of the art, and evaluating the usefulness for policy analysis of the work in each area. Few of the reports examined have been concerned specifically with the urban effects of federal policy. It has been necessary to extract potentially relevant findings from diverse studies, most of which were oriented toward issues far removed from those addressed in this report. One element of this diversity is that the existing research ranges from case studies of particular cities to sweeping reviews of national trends in urban affairs, limiting the ability to assemble consistent bodies of evidence on specific issues and to offer generalizations that apply to whole classes of cities, or to all urban areas. The diversity of the literature has enhanced the importance of the conceptual framework as a device for giving some coherence to what would otherwise seem isolated and unrelated research findings.

Second, as already explained, the report deliberately avoids duplicating the material in the two companion documents. This limitation applies primarily to material on federal policies that affect urban economic development by influencing (1) the local fiscal condition and (2) characteristics and distribution of the local population.

Third, the detail at which conclusions may be derived is limited. To the extent each urban area is unique, a study of the urban effects of federal policies should detail those effects for each area. This report attempts to derive more general conclusions—about different types of urban areas, defined by regional location or by size, for example. In addition, it is not possible to discuss all federal policies and individual acts of Congress administered by the 2000 bureaus, agencies, and administrations; it is possible only to consider the broader types of federal policies.

Finally, the complexity of the processes that determine economic development and industrial location limits the extent to which unambiguous conclusions may be reached concerning the factors that affect the urban economy and the influence of

federal policies upon those factors. Changing patterns of industrial employment and location are the product of decisions made by thousands of companies each year based upon the evaluation of a large number of factors—the decisions made by households, federal and local governments, and other businessmen whose actions have affected the comparative advantages of alternative locations. The factors that may affect plant location decisions are almost endless, and many defy quantification. Some of these may be obvious and measurable—the cost of labor or the cost of transporting raw materials, for example. Others are more nebulous—the locational preferences of a plant manager and family, expectations of the company concerning future developments, inertia, or limited knowledge of opportunities are just a few examples. Therefore, a number of factors that affect growth and development must be omitted from consideration. The complex and dynamic nature of the process means that any attempt to identify the causes of changes will only inaccurately represent the complex feedback mechanisms involved.

ORGANIZATION OF THE REPORT

Section II contains a discussion of the conceptual framework for exploring the economic effects of federal policies and programs. Integrated within this framework is an empirical review of some of the issues and problems of urban economic development. This review provides some motivation for the overall study and identifies the important outcomes. The motives for concern with the economic health of cities and the definition of the geographic unit of analysis are discussed. Three important geographical distinctions must be made: between central cities and suburbs, between urban areas in different regions, and between different types of cities and urban areas (defined by size, age, or economic structure). The principal economic outcome variables include employment, employment growth, output, and income. The types of federal policies and the linkages through which policies affect outcomes are identified.

Section III outlines a number of different analytic approaches to the analysis of the determinants of industrial growth and location and summarizes their problems and shortcomings. The approaches are the microeconomic theory of the location of the firm and supply-driven regional models of economic activity, urban spatial models, intraregional locational studies, and informal surveys. Although these five approaches are not always easily separable, this categorization provides a convenient basis for the literature survey.

Section IV, which reports the results of the review of empirical research, is divided into a number of subsections. Each describes what is known about the effect on location decisions and economic growth of changes in a given factor, including demand, labor, energy, municipal services and taxes, transportation, land, raw materials, industrial structure, leadership, amenities, and economies of agglomeration. Where possible, results from interregional analyses are separated from analyses by type of location (urban, suburban, and rural).

In Secs. V and VI, the conclusions from Sec. IV are used to analyze and assess the effects of federal policies on urban economic development. Many of the effects are the inadvertent results of federal actions and may have been avoidable in some cases had appropriate actions been taken. The focus is upon the results of federal policies rather than what could or should have been the results. Section V discusses

the effects of federal macroeconomic policies, which are aimed at changing the level of demand for goods and services and include monetary and fiscal policies, purchases of goods and services, and income redistribution programs. Section VI analyzes the influence of federal policies that affect the supply of productive factors. These policies and programs are targeted at goals that are not primarily concerned with the level of economic activity; for example, they include the regulation of the labor market, the regulation of transportation, and environmental protection.

Section VII summarizes the influences of federal policies, identifies the gaps in our knowledge concerning these effects, and draws up a tentative research agenda aimed at filling the gaps.

II. THE CONCEPTUAL FRAMEWORK

A great deal of attention has been focused upon the economic problems of a number of American cities, but there is little agreement among scholars or public officials about either what to include among urban economic problems or the issues that such problems pose for the federal government. Urban issues appear one way from the local perspectives and another from the national viewpoint. Further, the geographic definition of "urban" is ambiguous. It is unclear what measures should be used to assess the extent of the problems and how to link federal actions to changes in the economic health of urban areas. This section attempts to sort out these issues and to provide a conceptual framework for this report and for future research.

URBAN ECONOMIC PROBLEMS FROM A NATIONAL PERSPECTIVE

The immediate victims of the slow rate of economic growth in cities have no doubts about the existence of an urban economic problem and its seriousness. City workers with diminishing employment prospects, businessmen paying higher local costs, and public officials facing declining industrial tax bases and high levels of unemployment are likely to have little patience with those who ask whether urban economic decline is a "real" federal issue. Enough places and people are affected to make the problems national in scope. Some of our older cities appear to be unable to attract new jobs for their growing numbers of unemployed and are experiencing a net outmigration of businesses. New York City alone has lost over 600,000 jobs since 1969, and the increase in employment in many other cities is far below the national average.

To a considerable extent, the heightened pressure on cities during the past few years reflects macroeconomic developments—the recession of 1974-75 and the surge of inflation that began in 1972. Economic problems are interwoven with general, long-term aspects of urban decline. Over the years, rising costs, high crime, traffic congestion, increasing tax burdens, and deteriorating services and facilities have made central cities progressively less attractive than their suburbs as places to live, work, and conduct business. The same factors have contributed to the migration of population and economic activity from the older, urbanized regions of the Northeast and Midwest to the newer, growing, less-urbanized regions of the country. The loss of economic activity and employment in the older urban centers and the downward trend in urban populations (which has now spread from central cities to the suburban portions of many of our metropolitan areas)[1] may be slowed, but they are unlikely to be reversed by the national economic recovery. Without external intervention to improve the long-term economic outlook for the cities, there is little prospect for an end to the process of urban decline.

[1] See Morrison (1975). Recent trends are discussed in Sec. II of the *Population and Residential Location* report.

The issues are not nearly as clear-cut from a societal perspective as they may seem to the affected parties and their public representatives. There is a logical gap between the finding that cities are in trouble and the conclusion that it should be a federal policy to "save" them or to counter the economic and demographic trends that have undermined their public sectors. Even if the federal government adopted a general policy of intervention on behalf of declining cities, it is not at all clear what strategy could be followed without an accompanying high price in forgone economic development and impaired individual welfare in other locations. Consider, for example, the cases of middle-income families who leave central cities for suburbs and businesses that shift their operations from the urban Northeast to the "sunbelt." To those remaining in the cities, such moves usually represent losses; the markets for local firms have shrunk and the supply of skilled labor has decreased. To the areas of destination, however, and to the migrating households and firms themselves, the moves usually bring economic gains. Developments that harm those in declining cities may be beneficial to those in other locations. The 1976 annual report of the Congressional Joint Economic Committee concludes, "To a large extent, the interregional migration of population and employment opportunities is occurring in response to real economic forces affecting the cost and efficiency of production and has contributed to overall efficiency and productivity in the private sector and should not be discouraged."

Recent public discussions of the urban economic crises have focused on large cities that have experienced substantial job losses and high rates of unemployment. In many cases these cities had previously enjoyed above average wage rates and low rates of unemployment. Their relative decline may be seen as part of a tendency to equalize income and economic opportunities throughout the nation. Should they receive aid at the expense of growth areas that have lagged behind the pace of national development for so long? Even given the will to aid the cities, it would be no easy task to devise an appropriate and equitable national policy for targeting the available resources on the most pressing urban problems.

The complexities and ambiguities of the issues as seen from a national perspective do not imply that there should be no federal response to the problems of urban economic development. However, federal policies should rest on a more detailed and differentiated analysis of urban problems than seems to underlie most pleas for federal urban assistance.

Several approaches could be taken to relieve the economic strains created by the movement of jobs and workers away from cities. One would be to attempt to stem the flow of population and economic activity from the central cities and from older urbanized regions through development programs. A second would be to accept the underlying changes but to provide sufficient aid to those people and companies remaining in declining cities to compensate them, in part, for losses incurred as a result of the process. A third would be to focus on the remaining urban businesses and populations and to remove barriers to household and business mobility to allow them to leave.

The appropriate federal response to urban economic development problems depends upon whether the problems are viewed as characteristic of certain geographic areas or of the population remaining in declining areas. The special issues that arise in connection with geographically rooted problems are those of the distributional effects of federal economic development policies. On one hand, existing federal expenditure programs and regulatory processes may be biased against

the older urban centers. If so, then suburbanization and migration to the sunbelt cannot be interpreted as unambiguous pluses to the national economy. A variety of federal policy options could be considered under the heading of eliminating anti-urban economic discrimination. On the other hand, if anti-urban bias is not a problem, of if it accounts for only a minor fraction of urban decline, an alternative rationale must be found to justify a countervailing federal urban policy. The case for major federal efforts to save the cities must be based on the explicit judgment that the values of urban life justify some sacrifice of national economic growth. There have been many calls in recent years for a federal policy of "urban conservation" or a "national policy on urban settlement."[2] The kinds of federal policies that are offered as solutions to the problems of declining urban areas are:

1. POLICIES DESIGNED TO STIMULATE THE DEMAND FOR LOCALLY PRODUCED GOODS AND SERVICES. This can be achieved by directing the federal government to purchase goods and services from designated urban areas, through grants to local governments for local tax relief, and through transfer payments.
2. POLICIES AIMED AT IMPROVING THE COMPARATIVE ADVANTAGE OF DECLINING AREAS. A number of policies have been suggested in this category: the construction of new economic infrastructure including industrial parks, improved transportation linkages, and capital facilities; labor training programs and subsidized transportation services (for both freight and labor); improved municipal services, such as water, waste disposal, and fire protection; and fiscal incentives that offer tax advantages for new firms or existing firms that undertake expansion.

The proponents of these policies typically argue both for the value of the city and against the anti-city bias of existing federal policies. The degree of any anti-city bias is a matter to be studied empirically. The degree to which the value of the city justifies economic costs and restrictions on development and mobility is an issue on which political judgments must be made among competing social values.

The proposition that urban decline is primarily a problem of those who remain in the cities leads to a very different perspective on federal policy issues. From this point of view, the source of difficulty is that the departure of upper-income and middle-income taxpayers and erosion of the business tax base have left the urban public sector with insufficient resources to serve the disproportionately poor, elderly, and dependent populations left behind. If the basic federal concern is with the plight of these urban residents, the policy implications are far different than if the issue is how to save the city.

The federal policies that might help to solve the people-oriented problems are of the following kinds:

1. POLICIES TO SHORE UP THE REDISTRIBUTIVE TYPES OF SERVICES NEEDED BY DISADVANTAGED CENTRAL CITY POPULATIONS. Relevant options include welfare reform or federalization of welfare; federal or state assumption of responsibilities for education, health, or other social services; and assistance for low-income housing.[3]

[2] For an example, see CUED (1975).

[3] The Congressional Joint Economic Committee concluded that assistance should be given "to prevent the downward spiral in declining regions of soaring taxes and deteriorating public services." They also recommended the regional targeting of federal purchases to stimulate economic development.

2. POLICIES AIMED AT ENHANCING THE ECONOMIC OPPORTUNITIES AND LOCATIONAL OPTIONS OF INNER CITY RESIDENTS. Included under this heading are efforts to open up lower-income housing outside the areas and jurisdictions with concentrations of lower-income people and to improve transportation from the inner cities to decentralized workplaces.
3. POLICIES TO REDUCE THE INCENTIVES FOR CONCENTRATION OF "PROBLEM" POPULATIONS IN THE DECLINING CITIES. The main federal possibility under this heading is to change the features of federally supported welfare and social service programs that create large differentials between the benefits available in the central cities of the Northeast and those available in other parts of metropolitan areas or elsewhere in the country.

Of these three policy categories, only the first is compatible with a "save the cities" strategy. The last involves federal efforts to facilitate outmigration as a means of avoiding concentrations of the disadvantaged in declining urban centers. The inclusion of such policies underscores the philosophical difference between a view of urban issues oriented toward people and the more conventional geographically or jurisdictionally oriented views. The people oriented view implies that saving the cities is only a means to an end, and programs of federal aid to the urban public sector or of federally subsidized urban economic development should be evaluated as strategies for helping people injured by urban decline. However, they should be compared with policies that help the same people by facilitating their resettlement in more favorable environments. Preservation or revitalization of the older cities per se is not the goal of such "dispersion" policies.

THE UNIT OF ANALYSIS

The discussion of urban issues is often confused by the lack of a definition of exactly what geographical or political unit is discussed. There are three basic distinctions that must be made: between urban areas as a whole and their central city core; between urban areas located in different regions; and between urban areas of different types defined by size, age, or industrial structure. These distinctions allow us to examine the effects of federal policies in greater detail and they permit identification of different issues and problems that arise at different levels of the urban system. For example, if a policy affects only cities in one region, then the types of actions necessary to correct this regional bias may be very different from those designed to assist all urban areas.

Central Cities Versus Metropolitan Areas

It has often been argued that central cities experience urban problems more acutely than suburban areas. They tend to have higher rates of unemployment, more rapid job losses, and fewer high paying jobs. The distinction is important because of the jurisdictional structure of metropolitan areas. Each jurisdiction must be able to provide the public services demanded by its residents with the resources at its command. The selective suburbanization of certain labor force groups and of certain types of businesses may change the relative fiscal capacity of jurisdictions and also the relative demands placed upon them to provide public

services.[4] The system is dynamic; not only do economic changes affect the quality of local public services and their local tax "price," but the quality, the type, and the price of local public services will affect the location decisions of firms and households. This issue is discussed in Sec. IV.

The presence of jurisdictional boundaries reinforces other incentives for movement of firms and households away from the urban core. By crossing the municipal border, taxpaying firms can escape the burdens of paying for redistributive services for lower-income people in the cities. If the boundary line were not there, there might still be incentives for suburbanization but fiscal advantage would not be one of them. It is possible for a central city to be located in a prosperous and growing metropolitan area but fail to share in or benefit from that growth because its boundaries are fixed and the growth is taking place in politically independent surburban jurisdictions.

Some problems would remain even without the jurisdictional boundaries. The concentration of low-income households in a neighborhood may deter businesses. Such households may experience high unemployment and poverty because they are unable to travel easily within the metropolitan area to seek jobs.

Regional Differences

Many federal policies are region-specific either by intention or inadvertently. This regional effect may be due to deliberate regional targeting of federal policies—for example, federal spending for defense procurements—or it may be due to differences in the prevailing economic conditions or structure among regions—for example, federal construction subsidies may provide more assistance to rapidly growing regions than to slowly growing areas.

Trends in economic growth have differed markedly among regions. Table 2.1 shows the regional shares of national population and nonagricultural employment for the nine geographic census divisions in 1950 and 1970. The most striking feature of this table is the dramatic fall between 1950 and 1970 in the shares of total nonagricultural employment of the Middle Atlantic and East North Central divisions. The share of employment of the Middle Atlantic region fell from 24.1 to 20.0 percent of the nation's total, while its share of population fell from 19.9 to 18.3 percent. In the East North Central region, the share of employment fell from 22.9 to 20.7 percent, while the share of population fell only from 20.1 to 19.8 percent. The South Atlantic, East South Central, and Pacific regions all increased their share of nonagricultural employment by a larger percentage than they increased their share of population. Brian Berry summarizes the trend:

> Those areas declining most rapidly have been the central cities of the metropolitan areas that emerged during the nineteenth century, built on productive power, massed population and industrial technology. By the end of the century, these new cities have been credited with the creation of a system of social life founded on entirely new principles. A short half-century later they have become obsolete. These flowers of industrial urbanization—the great manufacturing belt metropolitan areas—are lagging.[5]

[4] The importance of jurisdictional boundaries and the implications for urban problems are discussed in the *Fiscal Conditions* report.

[5] Quoted in Sternlieb and Hughes (1975), p. 5.

Table 2.1

REGIONAL SHARES OF NATIONAL POPULATION AND NONAGRICULTURAL EMPLOYMENT

Region	1950		1970	
	Population	All Non-agricultural Employment	Population	All Non-agricultural Employment
New England	6.1	7.4	5.8	6.5
Middle Atlantic	19.9	24.1	18.3	20.0
South Atlantic	14.0	11.9	15.1	14.9
East North Central	20.1	22.9	19.8	20.7
East South Central	7.6	5.0	6.3	5.4
West North Central	9.3	8.0	8.0	7.6
West South Central	9.6	7.4	9.5	8.5
Mountain	3.4	2.8	4.1	3.8
Pacific	10.0	9.5	13.1	12.4

SOURCE: Bureau of the Census, *Statistical Abstract of the United States, 1973*, U. S. Department of Commerce, Washington, D. C., 1974.

The distinction between those areas located in the sunbelt (the East and West South Central and parts of the Mountain and West divisions) and the old manufacturing belt (New England, Middle Atlantic, and East and West North Central divisions) may be particularly important. Federal policies that encourage growth in the former may lead to a decline in the latter. It is important, therefore, to disaggregate the effects of some federal policies by regions.

Distinctions by Types of Urban Areas

Urban areas differ in their economic and spatial structure. The distribution of labor forces among industries, the availability of rail transportation, population density, the population size, and the age of the housing stock vary considerably. To the extent that federal policies affect a particular industry, mode of transportation, energy source, or type of labor, the effects of the policy will differ among cities. For example, urban areas with a high concentration of employment in consumer durables industries tend to experience rapid declines in employment during national recessions. There is also a different response to policies depending upon the relative growth rate of the urban area. For example, firms in fast growing areas benefit from federal tax policies that favor investment in new equipment.

Where federal policies are likely to exert differential effects on central city areas, or upon urban areas in different regions or of different types, the distinctions described in this subsection will be used.

ECONOMIC OUTCOMES: RECENT TRENDS

There are numerous ways in which the economic effects of federal policies might be reflected: Actions may affect the skills and earnings of the labor force, working conditions, production costs, the quantity and quality of output, and the

distribution of economic activity. It would be beyond the scope of this report to examine all of these possible outcomes in detail. For the geographical units defined above, the most important measures include the employment level, employment growth, per capita income, income growth, and the value of output. These measures have been chosen, in part, because most of the economic development research has used these measures as the "dependent variable." However, these outcomes also reflect important components of social welfare. All members of a community are affected by changes in job opportunities and in per capita income. Furthermore, these outcomes have important implications for the local public sector since they are related to the local tax base and to the demand for public services. They also affect the local housing market, since income and accessibility to workplace are major factors in the demand for housing. The remainder of this section reviews recent trends in these outcome measures in urban areas, providing some indication of the prevalence and severity of urban economic problems. However, declining urban employment or a slow rate of growth of per capita income in urban areas should not necessarily, or always, be interpreted as defining a "problem" from the national perspective. That is why these changes have been labeled as *outcomes* rather than as *problems*.

Employment

The share of employment located in central cities has declined steadily. From an examination of eight metropolitan areas, Fremon (1970) found that the share of metropolitan manufacturing employment located in the central cities had declined from 88.6 percent in 1900 to 60.8 percent in 1967.

Slow employment growth in central cities, compared with the more rapid employment growth in the suburban areas, appears in all major regions of the United States, especially during recessions. Nelson and Patrick (1975) examined annual employment growth by county in the United States during the period 1969-1972. They classified counties as core counties (containing the central business district), other central city counties (containing part of the central city), suburban (adjacent to central city counties), and nonmetropolitan. Although the time period covered is too brief to allow firm conclusions, some of their results, shown in Table 2.2, are of special interest. They divided their time period in two, reflecting the national recession from 1969 to 1971 and the expansion from 1971 to 1972. Manufacturing employment declined in central city or "core" counties in all census divisions during the 1969-1971 recession.[6] Total employment declined in core counties in five of the nine census regions. In all divisions the rate of growth in employment in core counties has been slower than the rate of growth in suburban counties, both during the recession of 1969-1971 and during the recovery of 1971-1972. With the exception of the Mountain and West South Central divisions, nonmetropolitan counties have consistently exceeded core counties in employment growth rate. These data indicate that the more rapid growth of employment in suburbs than in the central city is not limited to declining areas in the Northeast regions but is a nationwide experience.

[6] The United States is divided into four major regions—Northeast, Midwest, South, and West—and into nine major divisions. These are listed in Table 2.3. For a list of the component states of these regions, see Bureau of the Census, *Statistical Abstract of the United States 1974*, U.S. Department of Commerce, Washington, D.C., 1975.

Table 2.2

ANNUAL RATES OF GROWTH IN TOTAL AND MANUFACTURING EMPLOYMENT[a] BY METROPOLITAN STATUS OF COUNTY AND DIVISION[b], 1969–1971 AND 1971–1972

Census Division	Core		Other Central		Suburban		Nonmetropolitan	
Employment	1969-71	1971-72	1969-71	1971-72	1969-71	1971-72	1969-71	1970-1971
Total								
New England	-2.3	1.7	-2.1	5.6	-1.0	2.7	-0.6	4.3
Middle Atlantic	-2.0	-1.1	-0.8	0.3	-0.2	2.4	-0.6	2.2
East North Central	-1.8	-.6	-0.8	3.0	-1.3	4.1	-1.6	5.1
West North Central	-2.0	2.2	-0.4	3.0	-0.7	6.0	0.8	5.1
South Atlantic	1.2	5.2	2.6	9.0	2.8	7.5	1.4	6.7
East South Central	0.9	5.1	0.8	3.7	2.4	6.0	1.4	7.4
West South Central	1.4	4.6	1.2	6.4	3.0	6.1	0.8	4.8
Mountain	4.6	10.0	5.7	8.0	5.2	15.4	2.2	8.3
Pacific	-1.3	4.1	0.7	6.6	1.2	5.0	1.1	7.8
Nation	-0.9	2.3	0.6	4.7	0.1	4.3	0.4	5.6
Manufacturing								
New England	-8.1	0.4	-8.6	5.4	-6.6	-0.6	-6.3	1.5
Middle Atlantic	-5.9	-2.7	-4.6	2.9	-5.7	-0.9	-4.7	0.8
East North Central	-5.1	-1.2	-3.7	1.1	-5.2	1.5	-5.1	4.6
West North Central	-6.8	-0.1	-3.2	1.8	-5.9	4.5	-2.2	6.3
South Atlantic	-3.4	4.2	-1.1	3.6	4.1	1.7	1.3	4.2
East South Central	-2.5	3.4	-1.7	0.6	0.3	3.1	0.1	8.3
West South Central	-3.2	0.6	-1.1	10.3	1.8	0.2	0.0	5.2
Mountain	-0.6	6.9	1.8	3.4	1.6	6.9	0.1	7.0
Pacific	-7.4	3.4	-4.6	5.7	-4.8	-1.0	-1.8	7.8
Nation	-5.4	0.2	-3.4	1.7	-5.3	0.6	-2.5	4.5

SOURCE: Kathryn P. Nelson and Clifford H. Patrick, *Decentralization of Employment During the 1969-1972 Business Cycle—The National and Regional Record*, Oak Ridge National Laboratories, Tennessee, June 1975, p. 10.

[a]Annual growth rate = $[100(\ln[N_t/N_o])/(\text{year}_t - \text{year o}] - 100$, where N = employment, o = beginning of measurement period, and t = termination of measurement period.

[b]For a listing of the states included in each division, see *Statistical Abstract of the United States, 1974*, Bureau of the Census, U.S. Department of Commerce.

Are the poorer performances of core counties in some areas—particularly the New England, Middle Atlantic, and East and West North Central divisions—more strongly linked to rapid suburbanization of jobs or to regional shifts? A simple way of testing this is to perform a shift-share analysis,[7] which breaks down the rate of growth in a particular area into a number of components: The *national* component shows by how much employment in the area would have grown if all industries had grown at the same rate as total national employment. The *industry mix* component shows the difference between aggregate national growth rate and the rate at which the area would have grown if each of the industries had grown at the national rate for that industry; an area with a positive industry mix component enjoys a concentration of its employment in rapidly growing industries. The *interregional shift* component measures the differences between regional and national growth rates adjusting for differences in industry mix, and shows the region's competitiveness. The *intraregional shift* component records the differences in employment growth rates among different county types (central city, suburban, and nonmetropolitan) within the region.

Does the importance of interregional and intraregional shifts differ among regions? Three shift-share components for core and nonmetropolitan counties for each of the nine major census divisions are shown in Table 2.3. This table shows four important aspects of recent economic growth.

- In all except the small Mountain division, core counties experienced a negative intraregional shift during recession and expansion. This means that core counties have performed poorly relative to suburban counties in all divisions.
- The size of the intraregional shifts does not appear to be related to the overall economic performance of the region. The negative shifts do not appear to be larger (in absolute value) in divisions that have experienced slow overall growth than in divisions that have grown more rapidly. This implies that the performance of central cities relative to their surrounding areas is similar in all areas.
- Core counties performed relatively more poorly than suburban counties during the recovery period than during the recession. For no division did the value of the intraregional shift during 1972 exceed the value for 1969-1971. Recession appears to narrow the growth gap between central cities and suburbs.
- Differences among interregional shifts explain a greater part of the variation in total change among divisions than either of the other two shift components. This analysis shows that an understanding of the economic problems faced by many cities requires an understanding of the factors that lead to the wide variations in growth rates among major geographic areas rather than factors that lead to the suburbanization of employment opportunities.

The movement toward the suburbs holds for office industries as well as manufacturing. In a study of headquarters relocations from New York City, Quante (1974) analyzed the location listed by *Fortune* magazine of headquarters facilities

[7] The technique of shift-share analysis is described in Sec. III.

Table 2.3

COMPONENTS OF CHANGE IN EMPLOYMENT[a] FOR CORE COUNTIES AND FOR NONMETROPOLITAN COUNTIES BY DIVISION, 1969–1971 AND 1971–1972

Census Division	Core Counties				Nonmetropolitan Counties			
	Industry mix	Inter-regional shift	Intra-regional shift	Total change[b]	Industry mix	Inter-regional shift	Intra-regional shift	Total change[b]
New England								
1969-1971	-0.4	-1.0	-0.7	-2.3	-0.5	-1.1	1.3	-0.6
1971-1972	-0.1	-1.0	-0.7	1.7	-0.1	-1.0	1.8	4.3
Middle Atlantic								
1969-1971	0.3	-1.0	-0.9	-2.0	-0.6	-0.9	1.2	-0.6
1971-1972	-0.1	-3.2	-1.4	-1.1	0.3	-3.3	2.2	2.2
East North Central								
1969-1971	-0.3	-0.8	-0.4	-1.8	-0.8	-0.7	0.2	-1.6
1971-1972	-0.3	-1.1	-1.6	0.6	-0.3	-1.0	2.9	5.1
West North Central								
1969-1971	0.3	-0.7	-1.2	-2.0	0.5	-0.8	1.4	0.8
1971-1972	0.0	0.1	-1.4	2.2	0.2	0.0	1.3	5.1
South Atlantic								
1969-1971	0.8	1.8	-1.0	1.2	-0.8	2.1	0.5	1.4
1971-1972	0.3	3.0	-1.7	5.2	0.2	2.7	0.6	6.7
East South Central								
1969-1971	0.2	1.5	-0.5	0.9	-0.8	2.1	0.4	1.4
1971-1972	0.1	2.4	-1.0	5.1	-0.3	2.9	1.3	7.4
West South Central								
1969-1971	0.6	1.3	-0.1	1.4	0.2	1.1	-0.2	0.8
1971-1972	0.3	1.1	-0.5	4.6	0.2	1.0	-0.1	4.8
Mountain								
1969-1971	1.0	3.4	0.6	4.6	1.0	3.3	-1.7	2.2
1971-1972	0.5	5.6	0.4	10.0	0.4	5.2	-0.9	8.3
Pacific								
1969-1971	0.3	-0.8	-0.5	-1.3	0.3	-0.8	1.9	1.1
1971-1972	0.1	1.1	-0.7	4.1	0.2	1.1	2.9	7.8

SOURCE: Kathryn P. Nelson and Clifford H. Patrick, *Recentralization of Employment During the 1969-1972 Business Cycle—The National and Regional Record*, Oak Ridge National Laboratories, Tennessee, June 1975, p. 10.

[a]Expressed as annualized percent of initial employment.

[b]Includes an annualized national economic growth factor of -0.3 in 1969-1971 and +3.6 in 1971-1972.

of the largest 500 companies in the ten largest Standard Metropolitan Statistical Areas (SMSAs) in 1956 and 1971. During this time period, the ten largest cities in aggregate lost 57 headquarters, or 19.5 percent of the total, while their suburbs gained 37. Quante's data are shown in Table 2.4. Leone (1976) has argued that this decentralization might have resulted from rapid improvements in communications, which have allowed companies to move away from closely related firms without losing the ability to interact effectively.

Table 2.4

NUMBER OF FORTUNE "500" COMPANIES IN TEN CITIES, BY CITY, SUBURB, AND REGION, 1956 AND 1971

City[a]	Central City			Suburbs			Region		
	1956	1971	Change	1956	1971	Change	1956	1971	Change
New York	140	116	-24	16	40	+24	156	156	0
Chicago	47	37	-10	4	15	+11	51	52	+1
Pittsburgh	22	15	-7	2	0	-2	24	15	-9
Detroit	18	8	-10	2	4	+2	20	12	-8
Cleveland	16	14	-2	0	2	+2	16	16	0
Philadelphia	14	9	-5	8	4	-4	22	13	-9
St. Louis	11	10	-1	1	0	-1	12	10	-2
Los Angeles	10	15	+5	5	6	+1	15	21	+6
San Francisco	8	7	-1	4	8	+4	12	15	+3
Boston	7	5	-2	2	2	0	9	7	-2
Total	293	236	-57	44	81	+37	337	317	-20

SOURCE: Wolfgang Quante, "The Relocation of Corporate Headquarters from New York City," Ph.D. dissertation, Columbia University, 1974.

[a]The ten cities are ranked in the order of number of headquarters in 1956.

The loss of headquarters establishment employment from large urban areas differs by region and also by city size. Western SMSAs[8] gained 11 of the top 500 headquarters offices, Southern cities[9] gained eight and the Midwest[10] gained one, while the other manufacturing areas in the East and Northeast[11] lost 23. The first ten largest cities lost 25 headquarters, the next ten largest gained 12, the third ten largest gained three, and the fourth ten largest gained 7. The tendency is toward the location of headquarters facilities in smaller SMSAs.

The decline in central city employment, or its slow rate of growth, is associated with unemployment rates that are typically above those in suburban and nonmetropolitan areas. In 1974, 5.9 percent of males in the central city labor force were unemployed compared with only 3.4 percent in suburban areas and 4.4 percent in nonmetropolitan areas.

[8] Including Los Angeles, San Francisco, Dallas, Houston, Seattle, San Diego, Denver, Portland, Phoenix, and San Antonio.

[9] Including Atlanta, Miami, New Orleans, Tampa, Memphis, and Birmingham.

[10] Including Chicago, St. Louis, Minneapolis, Detroit, Milwaukee, Kansas City, and Indianapolis.

[11] Including New York, Philadelphia, Baltimore, Washington, D.C., Boston, Cleveland, Pittsburgh, Cincinnati, Buffalo, Providence, Rochester, Dayton, Hartford, Albany, and Toledo.

Employment decline may be caused by companies reducing their labor forces, moving out of the city, or closing permanently. Little research has been done to conclude which of these forces predominates. However, in a detailed study of the New York region between 1969 and 1971, Leone (1976) found that job loss through the net outmigration of companies was insignificant. Out of a total net job loss of 65,538 in New York City between 1969 and 1971, the loss through the excess of company deaths over company births was 35,473, the net change in companies staying within the city was 26,233, and the change due to net outmigration of companies was only 3,832.[12] Company relocations do not appear to be the major force for suburbanization in New York. However, Struyk (1976) summarizes the results of similar studies in Boston, Cleveland, and Phoenix and finds a considerable difference among cities. For example, in Cleveland between 1965 and 1968, the absolute change in employment in new (including inmigrating) and dying establishments was greater than the change in existing companies. The reverse was true in Boston and Phoenix.

Business relocations do not appear to be the major force for differential regional growth. Beckman (1974) found that, of 1233 companies moving out of New York City between 1961 and 1973, representing a loss of 124,872 jobs, 41 percent of the companies relocated in New York State, and 48 percent of the companies relocated in the neighboring states of New Jersey (37 percent), Connecticut (7 percent), and Pennsylvania (4 percent). Only 11 percent of the companies moved away from the Northeast region. More than half of the employment loss in the Northeast between 1969 and 1972 was due to the death of existing firms, and less than 2 percent was due to the outmigration of firms. Conversely, 64 percent of the employment gain in the South was caused by the expansion of existing companies and 1.2 percent to the inmigration of firms (Allaman and Birch, 1975).

This evidence suggests that an explanation of the differences in economic growth between city and suburb and among regions requires an examination of factors affecting the behavior of nonmoving companies that may differ from factors affecting the location decisions of the small number of footloose companies. The "urban problem" is related most strongly to interregional differences in growth.

Income

Household income in central cities is below that in suburban areas and the difference in expanding. Gorham and Glazer (1976, p. 21) point out that "between 1960 and 1970, the median income of central city residents as a percent of the median income of the entire metropolitan area declined from 94 to 91 percent in Pittsburgh, from 90 to 87 percent in Cincinnati, from 85 to 80 percent in Cleveland, from 93 to 89 percent in New York, and from 89 to 83 percent in Detroit." The growing concentration of low income households in many cities affects the local demand for goods and services, the availability of skilled labor, and the local tax burden.

Per capita income differs among regions. The New England, Mid-Atlantic, East North Central, and Pacific regions all enjoy per capita incomes that are above the national average; the South Atlantic and South Central regions are considerably

[12] To some extent Leone's results may be misleading since some companies may be leaving the city to start up business at a new location under a new name.

below the national average. In Table 2.5, per capita income and relative per capita income are shown by region for 1975. There has been a marked tendency for the inequalities among regions to diminish. Between 1964 and 1975, the four regions in which per capita income exceeded the national average experienced a decline in per capita income as a percent of the national average, while regions whose per capita income was below average drew closer to the national average.

Table 2.5

PER CAPITA INCOME 1975, INCOME GROWTH 1964–1975, AND UNEMPLOYMENT RATE 1975, BY REGION

	Per Capita Income				
		As Percent of U. S. Average			
Region[a]	1975 (dollars)	1964	1975	Percent Change 1964-1975	Unemployment Rate 1975
New England	6086	108	104	-4	10.3
Mid-Atlantic	6377	115	109	-6	9.3
East North Central	6131	107	105	-2	9.0
West North Central	5714	92	98	+6	5.8
South Atlantic	5353	84	92	+8	7.9
South Central	4896	78	84	+6	6.9
Mountain	5374	90	92	+2	7.5
Pacific	6461	116	111	-5	9.8
Nation	5834	100	100	—	8.5

SOURCE: The *National Journal*, June 26, 1976, p. 887. Reprinted by permission of the *National Journal*.

[a]The regional definitions correspond to census definitions of divisions except in the case of the South Central region, which includes both the East and West South Central divisions.

LINKAGES BETWEEN LOCAL ECONOMIC DEVELOPMENT AND FEDERAL POLICIES

The relationships that link federal policies with urban economic development are both complex and dynamic. The local business sector can be thought of as responding to two types of stimuli in deciding where to locate and how much output to produce: the level of demand for goods and services and the prices and availability of productive factors at alternative locations. The level of demand is partly determined by the size and characteristics of the local population—outcomes of the population and housing sector. The prices and availability of productive factors and other aspects of the business environment are determined by the operation of the factor markets (including the land, capital, and labor markets) and by the level of taxes and local public services—outcomes from the local public sector.

This system is represented schematically in Fig. 2.1. This figure shows federal policies, economic development outcomes, decision processes, and the major linkages in the urban economic system. This figure shows the business sector at the center and its linkages with the public sector and the local population and housing

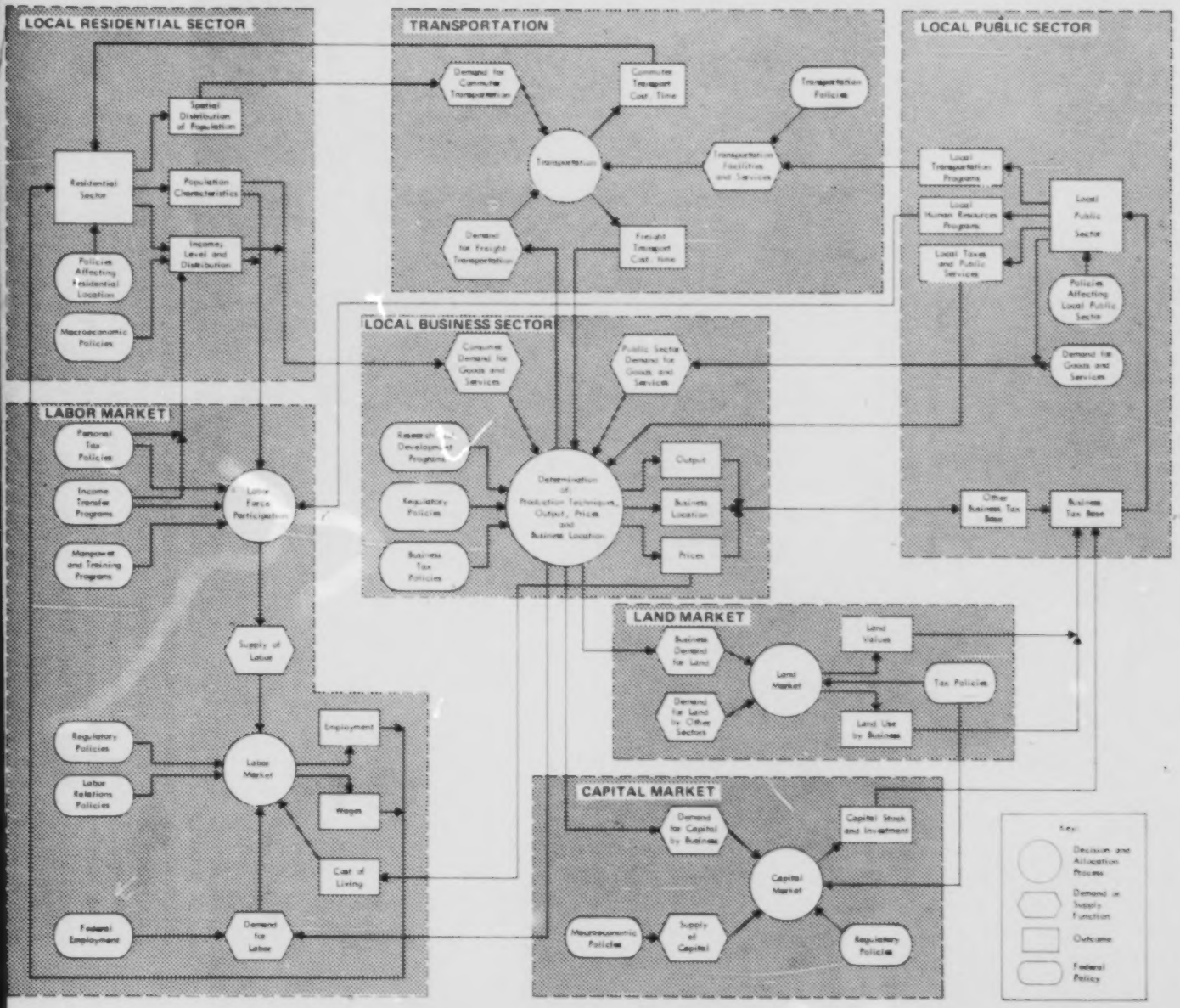


Fig. 2.1—Linkages between federal policies and the business sector

sector. The relationship between the business sector and four major input markets are also shown: These markets are land, capital, labor, and transportation. Outcomes, both intermediate and final, are shown in rectangles; the residential and local public sectors, not discussed in detail in this report, are represented by large squares; federal policies are represented by ovals; decision processes by circles; and demand and supply functions by hexagons. The remainder of this section discusses the most important aspects of this system.

The Business Sector

The business sector, in the center of this figure, is represented as making three simultaneous decisions: first, what productive processes to use; second, what goods to produce, the level of output, and the prices at which these goods will be sold; finally, where to produce its output. These decisions are made in response to the level and distribution of *demand* for goods and services, and the price and availability of productive factors—*supply* conditions.

The Demand for Goods and Services

The demand for goods and services is determined by three factors: the characteristics and income of the local population (outcomes of the local labor market); the aggregate level of economic activity, which determines the export demand for output; and the public sector demand for output.

Direct federal involvement in business decision processes includes research and technology programs, regulatory policies, and the business tax structure. A number of federal policies affect the level of aggregate demand:

- MACROECONOMIC POLICIES. Fiscal and monetary policies affect levels of income and employment. Although these are economy-wide effects, economic recessions may be particularly severe in certain types of urban areas and in certain regions.
- GOVERNMENT PURCHASES OF GOODS AND SERVICES. Every year the federal government spends billions of dollars on goods and services. By selecting their sources of supply, the federal government may affect the regional distribution of employment.
- FEDERAL TAX POLICIES. The structure of taxes on capital gains and on corporate and private income, and excise taxes, significantly affect the level of disposable income.
- INCOME TRANSFER PROGRAMS. Federal income transfer programs that redistribute income among population groups may affect the demand for goods and services by these income groups.

Supply of Goods and Services

The attractiveness of an area as a place to do business depends upon the prices of factors of production, including labor, land, capital, and transportation. Areas in which factors are priced high relative to their productivity will be unattractive, encouraging marginal firms to move away and slowing the growth rate of nonmoving firms.

Labor Market. In the labor market, business sector and federal and local government demand for labor interact with the labor supply, determined by the level and characteristics of the local population, to determine employment and wages. The spatial distribution of population, the characteristics of that population (including age, job experience and skills, and family structure), and the level and distribution of income determine labor force participation. Together with the local cost of living (determined in part by the prices of local output), labor force participation and migration of labor determine the supply of labor. The outcomes—wages and employment—affect local incomes and their distribution and the local business tax base; in addition, the distribution of employment, together with the distribution of population, affect the demand for commuter transportation.

Federal involvement appears through macroeconomic policies, which affect income; the personal tax structure; transfer payments, which affect both income and willingness to participate in the labor force; and training and education programs, which affect only the latter. The quality and availability of labor are also affected by a number of federal policies: Federally financed educational and training programs increase the skill of labor; safety regulations affect working conditions; labor relations policies, social security and welfare payments, and minimum wage legislation affect the operation of the labor market.

Land Market. Business demand for land derived from the demand for final output and production technology, and the quantity of land available determine local patterns of land use and value. This affects the local tax base. Federal involvement in the business tax structure is through land use controls and direct federal purchase of land.

Capital Market. The demand for loanable funds by businesses interacts with the supply of loanable funds to determine the level of investment and the capital stock (through the rate of interest). This affects the local property tax base.

The cost of loanable funds has been influenced by the regulation of banking and many programs that affect the supply of savings—social security, income taxes, and tax advantages—as well as by federal monetary and fiscal policies that affect the aggregate level of economic activity.

Transportation. Employees demand commuter transportation services, and businesses demand freight transportation to ship raw materials and intermediate goods and final output to consumers. The availability of road, rail, and canal networks, and public transportation services, determines the out-of-pocket and time costs of using alternative methods of transportation. These outcomes affect the distribution of population and economic activity.

The federal government has considerably influenced the cost of alternative forms of transportation. The interstate highway system has reduced the costs of interarea truck transportation, and the regulation of freight rates and methods has affected the prices and availability of services.

Indirect Influences Through Other Sectors

Residential Sector. The main influences of the residential sector are upon the supply of labor and upon the demand for final output. These aspects have already been outlined. Federal policies that exert a primary influence on the residential sector are discussed in detail in the *Population and Residential Location* report. The following are but a few major examples of federal policies that have influenced, and that continue to influence, urban population and housing patterns:

- Federal housing production and credit policies (and related tax policies) have had a major role in encouraging the movement of middle-class households to suburbs and the concentration of low-income households in central cities.
- Federal highway programs have facilitated and encouraged suburbanization of households.
- Federally aided welfare programs are thought to have encouraged the concentration of poor and minority populations in center cities. They may also have contributed to economically or racially motivated middle-class flight and to consequent reductions in the urban revenue base.
- Many federally supported social service programs—in such fields as education, health, criminal justice, and water and sewer services—have affected living conditions inside and outside of cities. Some of these have had positive, and some negative, effects on the attractiveness of urban locations to different segments of the population, and thereby on the urban fiscal base.

Local Public Sector. The local public sector provides local businesses with public services—water, waste disposal, fire protection, and, in some cases, special facilities and assistance. In return for these services, the local government charges a tax price. The price and the attractiveness of the local services will make a jurisdiction more or less attractive to businesses. The local public sector may also affect economic activity through its purchase of goods and services and through its manpower programs that enhance the local labor force.

The federal involvement in the local public sector is discussed in detail in the *Fiscal Conditions* report. There are a number of major federal influences:

- The federal government currently expends more than $50 billion per year in grants-in-aid to state and local governments. A large fraction either accrues directly or is passed through by the states to local governments in urban areas. This aid accounts for a significant fraction of the total revenue of those units of government. The grant-in-aid system is the largest and most important form of direct federal involvement in the urban public sector.
- The federal government enhances the ability of local governments to raise revenue by making local (and state) taxes deductible from federally taxable income. This reduces the burden on local taxpayers of locally imposed levies. Similarly, the federal government makes it easier for local governments to borrow by exempting interest on municipal bonds from federal income taxation.
- The federal government assumes certain financial responsibilities that would otherwise have to be borne by state and local governments. An important example of this form of aid is the 1974 federalization of welfare programs for the elderly, blind, and disabled (the Supplemental Security Income program, or SSI, which provides at least $2 billion per year in fiscal relief).
- On the negative side, certain federal programs and policies impose financial burdens on state and local government. Examples include the requirements for local matching funds that sometimes accompany federal grants,

the service standards and coverage requirements that are sometimes made conditions for the receipt of federal aid, and the expense of complying with federal laws and regulations in such areas as civil rights, safety, and environmental protection.

Summary

The linkages depicted in Fig. 2.1 are only some of the avenues of prime importance. Each of the connecting lines represents a relationship between outcomes that is, at least theoretically, empirically measurable and that needs to be measured if the influence of federal programs and policies on urban economic development is to be assessed. For example, how do changes in transfer payments to a location affect labor force participation or local disposable income? How is a change in local income related to the demand for locally produced goods and services? How is a change in local tax rates related to the location of industry? Figure 2.1 provides a framework for the review of the literature discussed in the following sections.

III. TECHNIQUES FOR ANALYZING INDUSTRIAL LOCATION AND DEVELOPMENT[1]

The process of economic growth and development has been examined using a variety of analytic techniques. This section reviews the major approaches, providing a background for the empirical results reported in the following sections. A brief overview will show the logical interrelationships among the various techniques. A description of supply and demand driven regional growth models will be followed by an outline of empirical models that have combined both demand and supply elements. Then supply and demand oriented locational models will be outlined and those models described that include both demand and supply elements. Finally, a number of analytic techniques that are not easily categorized will be briefly outlined and conclusions drawn.

OVERVIEW

Although the various empirical models used appear to be different, they are derived from the economic theory of the firm. The profit-maximizing firm, the production counterpart of the utility-maximizing consumer, determines both the level of output and the production process in response to the market demand for its output and to the price and availability of productive factors. From this simple theory two types of models have been derived: those that attempt to explain the *growth* of employment and those that attempt to explain the *location* of employment within a given area. The approach is based on the theory of the location of the firm in which demand and production costs vary spatially.

Regional Growth Models

Two distinct growth models have been developed. The first emphasizes the supply aspects of production. A given region is assumed to face an infinitely elastic demand curve for its output. The region will grow only through increases in the supply of factors of production. The unit of analysis is the region rather than the individual firm. An aggregate production function for the entire region is assumed. The model emphasizes the importance to regional development of attracting capital and labor and allows the estimation of their relative contributions to increases in output. However, the role of demand is ignored.

The second type of regional model focuses upon the importance of an increase in demand in stimulating growth. Factor supplies are assumed to be in infinitely elastic supply to the individual region; labor will be attracted by jobs and capital by investment opportunities. The region will grow in response to increases in

[1] This section does not examine, in any detail, urban simulation models that have been developed to predict the path of economic growth in regions for two reasons: First, budget and time constraints prevent the detailed analysis and evaluation that such models deserve; and second, these models tend to be developed and calibrated for individual cities or regions, and there has been little attempt to test their applicability to other areas.

demand for the output of one sector, which may result when the rest of the nation purchases more of the output of the region's export sector, or when there is a growth in public expenditures on goods or construction. This increase in demand leads to increased employment in that sector, which leads to increased demand in other sectors through the local multiplier effect.

A number of econometric models have been developed that introduce supply and demand simultaneously in order to estimate the interactions between both the growth of factors of production and the growth of demand. These models may be regarded as a synthesis of supply and demand models. They offer the additional value that they can estimate the relative contributions of supply and demand to the growth process.

The basic microeconomic model has been criticized because of its assumption that profit maximizing is the crucial goal of the individual firm (Daly and Webber, 1973). Growth maximization subject to a minimum profit rate has been suggested as an alternative (Winter, 1971). Daly and Webber suggest an alternative behavioral theory of the firm based upon firms' growth patterns and managements' learning how to adjust over time to changes in plant sizes, factor costs, and regional comparative advantages. They identify two stages in the growth of a firm. "In the first stage, the firm does not increase its scale but learns to operate efficiently so that when demand warrants it, it can move to a new scale of operation" (p. 209). In the second stage, some firms fail to learn, others expand in a complex but quantifiable way. Further investigation of alternative goals is required since the short-run and long-run goal orientation of firms is obviously an important factor in determining industrial growth.

None of the models outlined above, in their simplest form, are concerned primarily with patterns of location—either interregionally or intraregionally. There have been several modifications of the demand drive model to disaggregate employment according to a number of areas, and to allocate employment changes among those areas. Both supply and demand models yield some implications for interregional shifts inasmuch as they can be used to explain interregional differences in growth rates. However, models designed specifically to examine the spatial distribution of employment have been derived from the microeconomic theory of the location of the firm.

Location Models

The study of the spatial location of firms as a business decision was first developed by Weber (1929). He assumed that there is a fixed coefficient production function and a competitive output market, implying that individual firms faced a given market price at which they could sell their output. The firm therefore selected the location that minimized production costs. Transportation costs for material inputs were assumed to be the only cost that varied across locations. Therefore, these costs dominated location theory. Hoover (1937) modified the Weberian approach by introducing a less rigid production function that allowed input substitution, economies of scale, and a realistic transportation rate structure.

An alternative school, expressed in the writings of Fetter (1924), Hotelling (1939), and Lösch (1954), argued that the potential market area was the key to industrial location. Transportation costs were again of key importance, and "the

Weberian problem was inverted by assuming identical production costs between firms and concentrating the effects of transport costs in delivering goods to the market. Locations were chosen primarily to maximize market areas" (Daly and Webber, 1973, p. 304).

Isard (1956) fused the input and output transportation schools into a more general theory of the firm in which the transportation input was defined as "the movement of a unit of weight over a unit of distance" (p. 79). This input "could be substituted for other inputs as labor, taxes, land, and capital in the profit maximizing decision process of the firm" (Harris and Hopkins, 1972, p. 3).

The basic form of the neoclassical location theory of the firm is that of a company that maximizes profits, π, which at any location, k, are the difference between revenue, defined as price multiplied by the quantity $Q^k \times P^k(Q^k)$, and costs, defined as the sum of the expenditures on the individual inputs, $\Sigma_i p^k_i q_i$. This can be written as,

$$\pi = Q^k \times P^k(Q^k) - \Sigma_i p^k_i q_i$$

where p^k_i is the price of the ith input at location k, and q_i is the quantity of the ith input used. The quantity of an input used will depend on the relative cost of the input and on the production function of the firm. Each firm faces a given function relationship between the price of output and the quantity sold at any given location, $P^k(Q^k)$, and also between the prices of productive inputs, p_i, and the production function. A firm is able to change the quantity of output and the location. These profit maximizing considerations are shown in Fig. 3.1. The vertical axis measures total dollar costs and revenues, and the horizontal axis measures the quantity produced. The NTR_a and NTR_b curves represent the net total revenue received by the company as a function of output at two locations, A and B, net of transportation costs associated with varying quantities of output at locations A and B. The TC_a and TC_b curves measure the corresponding total costs. At location A, if one equates marginal costs and marginal revenue, the company will produce Q_a and earn total profits equal to the vertical distance between TC_a and NTR_a. At location B, the company will produce Q_b and earn profits equal to the vertical distance between TC_b and NTR_b. Location A yields a higher total profit, and therefore the company will choose to locate there.

The pure theory of location has produced a number of alternative empirical techniques. They may be divided into those that focus upon supply elements—particularly the spatial structure of factor costs, including land prices—those that focus upon demand, and those that attempt to include both.

The location theory of the firm has very little to say about changes in the level of output over time. It is a long-run, competitive equilibrium theory and, as Spiegelman (1962, p. 14) observes, "long-run competitive equilibrium in a space economy is the same as in a non-space economy; that is, firms will produce where marginal cost equals marginal revenue and average cost equals price." The theory has no implications for the process of adjustment to disequilibrium as companies respond to changes in factor prices, production technology, and market demand. As Alonso has argued (1967), the optimal location for a company will rarely coincide with the place where transportation costs are minimized. Harris and Hopkins (1972) conclude that the neoclassical model of *optimal* plant location may be of little relevance in explaining actual patterns of economic growth and that in order to explain industrial location, "we need, rather, a model of interregional, multi-industry

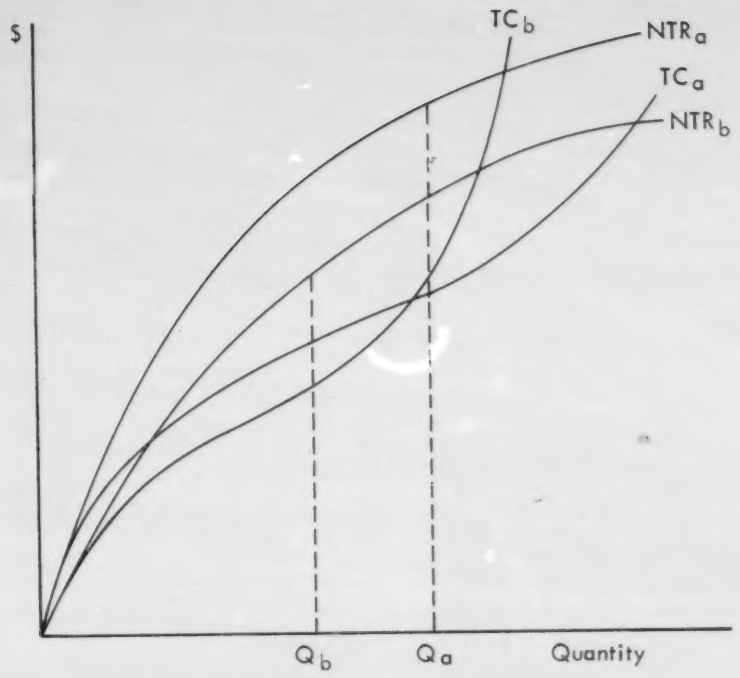


Fig. 3.1—Profit maximizing output at locations A and B

disequilibrium adjustment" (p. 3). There have been a few attempts to model that disequilibrium adjustment mechanism in growth models, based upon the inclusion of an inertial component, or through the concepts of desired and actual capital stocks. Econometric models are being developed that allow adjustment to disequilibrium within a spatial model.

FACTOR SUPPLY GROWTH MODELS

Description

The first type of growth model that derives from the theory of the firm relates growth in output to increases in the supplies of factors. The demand for the output of the region is assumed to be infinitely elastic; any increase in output can be sold at the given price. Output increases as the regional labor force grows and as capital is accumulated. The relationship between inputs and output is often some form of the neoclassical production function. Growth in any one sector or region can occur only if labor is diverted from other sectors or regions. Richardson (1971, p. 191) argues that, in the long run, factor flows may be a much more important determinant of growth than shifts in demand. He provides a succinct description of the basic supply model process:

> The growth potential of a city depends upon its ability to create and attract from outside the productive resources needed for growth as well as on its ability to produce the goods and services in demand in regional, national or international markets. The growth of the city . . . is determined by its rate of population growth, its rate of capital investment and its rate of technological progress, widely interpreted. . . . To grow fast, a city must obtain productive factors from outside, and act as a magnet for migrants, outside capital, non-local managerial talent and skilled technical personnel, and innovation.

This kind of model places renewed emphasis on the importance of amenities and new types of economies of agglomeration, having to do with the delivery of education and research services and residential and cultural amenities. The pathbreaking work of Ullman (1958) has shown the importance of research centers, where close interconnection is crucial among scientists, technologists, entrepreneurs, specialist libraries, and patent activities.

Borts and Stein (1964) used this kind of model to analyze different rates of growth between regions. Using a "three good" model borrowed from international trade theory, they assumed that each region faced fixed prices for the goods it exports, imports, and consumes; that each sector received a fixed share of total regional expenditure; and that labor force and labor force growth rate were exogenously determined. They concluded that regional growth rates are determined by labor force growth rates. Similar findings were reported by Perloff and Dobbs (1960) and Smith (1975). A more rigorous application of the neoclassical growth model to state employment growth rates over time by Smith (1975) found support for both the assumption of a Cobb-Douglas growth model and that interstate capital flows played a major role in the equalization of per capita income among regions over time.

Problems

The use of neoclassical growth models in general and their application to patterns of regional growth have been subjected to criticism. Richardson (1973, p. 69) states:

> The background assumptions of neoclassical growth theory are inapplicable to the regional economy. For instance, the full employment assumption is not usually relevant to regional economics since to a marked extent regional problems emerge because of substantial interregional differences in the degree of resources (and particularly labor) utilization.

Conroy (1974, p. 97) argues that this criticism may be excessively harsh, since Muth (1969) had adapted the model to regional differences in resource utilization. Conroy admits that the neoclassical growth model approach

> does tend to omit phenomena such as agglomeration economies in location and urbanization, differing transport costs and interdependence of location decisions which we know to be important. But no export base model comes much closer to these phenomena. In fact, the failure of our conceptual models to incorporate phenomena of such central importance to regional and urban development is a ringing critique of the entire field and a fundamental obstacle to the formulation of urban development policy.

DEMAND DRIVEN GROWTH MODELS

The alternative to regarding the supply of factors as the key to growth is to emphasize the demand for the output of goods and services as the basic driving force. The supply of factors to a given region is assumed to be infinitely elastic. The demand for output is the sum of the demand by residents of the region for consumption goods, industry in the region for investment goods, the rest of the nation for the exports of that region, and the public sector for goods and services. An increase in any of these components of demand will lead to an increase in employment in the supplying industry, which will lead to an increase in demand for the output of other sectors through the local multiplier effect.

Since, within the simple version of the model, the level of regional demand is determined by the level of regional income, which is determined by the level of regional employment, a region can grow only if there is an exogenous shift in extraregional demand for the region's output. Models of this form became known as "export base models" because of the primary role of export demand in determining growth.

A detailed description of the techniques used to identify the export base multiplier is beyond the scope of this study. A brief overview of the approach is given. The concept of a regional multiplier is borrowed directly from the Keynesian model of the national economy. The level of income or employment in a region, Y, is a function of the level of export demand, E; the marginal propensity to consume goods produced within the region, c; and the marginal propensity to import goods from other regions, m. Thus

$$Y = E/(1 - c + m).$$

The logic is briefly that if a dollar (or enough money to buy the output of one employed person) is spent in a region, some will be saved $(1 - c)$, some will be spent on goods produced in other regions (m), and the remainder will be spent in the region, generating local jobs and income. The larger the amount saved and the larger the fraction of goods imported, the smaller will be the multiplier and the lower the level of economic activity within the region for a given level of exports. The rate of change of exports drives regional development. For employment to change as a result of an increased demand for exports, there must be some unemployment in the region or some inmigration of labor.

The export sector is typically defined as manufacturing and agriculture. Niedercorn and Kain (1963, p. 125) cite a Kansas City Federal Reserve Bank study that calculated, for Wichita, Kansas, that manufacturing was 50 percent of "base" employment in 1940 and 71 percent in 1950. That a considerable part of manufacturing or agricultural output may be produced to satisfy local needs and that other sectors may produce exports indicate that this major variable is not easy to define accurately. The simple model has been refined to allow for employment growth resulting from the development of import substitution industries (Burrows et al., 1971). As a region grows, it develops new industries, and therefore a smaller share of local expenditure is spent on imported goods (m falls). The volume of job-creating investments has been included in the measure of aggregate demand (Czamanski, 1964). Federal transfer payments and nonlabor income have also been included in demand.[2]

[2] See, for example, Bolton (1966) and Polenske (1969).

Two distinct ways of relating an increase in export demand to the total increase in demand in the region can be identified. The first uses input-output techniques. Interindustry linkages in a region are estimated using the national input-output table or local information. Employment in the export industry is then linked to employment in all those local industries from which it purchases inputs and to which it sells its output.

The second type of model uses econometric modeling techniques. Interindustry linkages are estimated using time series or cross-sectional correlations between sectoral employment levels in the region or across regions. This allows the model to be suited specifically to the characteristics of the region. The technique also allows for secular changes in interindustry linkages over time, which may result from changing techniques of production or from the development of new products.

Both of these techniques are used to construct the export base model of regional economic activity. This model can be used to predict levels and growth paths of either regional income or regional employment, depending upon how the linkages are defined.[3]

There have been several attempts to spatially disaggregate the demand driven growth model and to explain the distribution of employment among a number of zones. Changes in employment by sector are distributed among zones according to the relative concentration of employment of the sector within each zone. Attempts have been made to include factor supply constraints within this basic framework, including the overall availability of land, for example. Some of these models have been developed for specific urban areas. The Detroit model developed by the National Bureau of Economic Research (Ingram et al., 1972) provides a dynamic model in which population and housing stocks change over time and space.

Demand driven regional models may provide a useful technique for projecting regional growth and for estimating the effects of changes in public or private expenditure. They are easy to construct and to use. However, they are subject to several objections. First, the approach assumes that all relationships within a region's economy will remain constant over time or, if they change, will change according to a simple secular trend. Second, early models assumed that only exports can determine income and had no place for investment (public or private) or for income from other sources, such as interest payments, property income, or federal transfer payments. Third, as noted above, the concept of an export sector is artificial and constraining. Finally, as Burrows, Metcalf, and Kaler (1971, p. 7) argue, "far from assuming that base/service ratio is constant, the purpose of regional economics should be to explain the magnitude of this ratio and to be able to project changes in the ratio." Some formulations of the basic model have also included a flexible base/service ratio to allow for the expansion of import substituting industries.

Export base models have little to offer in the analysis of the importance of the *cost* or the *availability* of productive inputs and of the role of other regional demographic and economic characteristics in determining the process of growth and development. In fact, the model assumes unused resources and no factor constraints on the level of development. This problem is not important in the analysis of a single small region, which can draw upon the potential labor and capital

[3] Models of these types have been developed by Tiebout (1956 and 1962), Andrews (1953 and 1956), Isard et al. (1960), Bezdek (1971), Bolton (1966), and Burrows et al. (1971), among others.

supplies of surrounding areas, as well as upon capital, raw materials, and intermediate inputs. The problem is more severe if one attempts to examine a large number of regions.

GENERALIZED GROWTH MODELS

A class of growth models have been developed that incorporate elements of both supply and demand. These may be divided into two types: first, a "reduced form" model that relates employment levels or growth to independent variables that measure factors related to both the demand for final output and the supply of inputs; and second, simultaneous models that attempt to include, directly, some of the simultaneous interactions between variables in the system.

Reduced Form Models

At their simplest, reduced form models relate the growth rate or the level of employment in a given area to rates of change or the levels of a number of independent variables. The selection of these variables is justified, a priori, by some of the general hypotheses drawn from the theory of the firm. The model is estimated either from time series data from one area, from cross-sectional data for a number of areas, or by a pooling of cross-sectional and time series data.

One of the earliest studies of this sort was by Thompson and Mattila (1959). They regressed nonagricultural employment growth by state in the period 1947 to 1954 against a number of variables, including previous population growth (1940-1947), income growth, and wages. Their regression results were quite poor. Explanatory variables were insignificant and little variation in growth rate across states could be explained. They simplified their analysis even further and examined pairwise correlations between measures of employment growth and individual explanatory variables. Their results are discussed in Sec. IV. Wheat (1973) performed a similar type of correlation analysis. Burrows, Metcalf, and Kaler (1971) also adopted a cross-sectional approach but disaggregated their analysis into 22 industrial sectors and had many more explanatory variables, including, for each industry, the employment growth in important supply industries and industries that purchased a significant share of the output. Fuchs (1962) used time series data of employment by state and related this to the population growth rate, wages, and the rate of unionization, among other factors. Harris and Hopkins (1972), in a very disaggregated analysis, refined this technique even further. They estimated the growth of output (1965-1966) in each of 84 industries across all counties as a function of the marginal costs of inputs (including transportation costs), the transportation costs of shipping output to other areas in the country, and other measures of demand and supply determining factors. Their results are discussed in Sec. IV.

These models have the advantages of being fairly easy to estimate and of using readily available data. They measure important factors that determine regional growth and development and the response of industries to changes in growth determining variables—the adjustment during disequilibrium. In this respect, they provide a useful dynamic framework, which the comparative static theory of the firm does not.

These models have two major types of problems. First, the variables do not correspond directly with demand or supply determining factors. For example, it is unclear to what extent population growth measures a change in consumer demand or a change in the availability of labor. The second problem is that the model assumes a "one-way" relationship between the independent and dependent variables. Population changes are seen as an exogenous force leading to employment changes. Clearly the interaction between population and employment is more complex than that. Although some types of firms will be drawn to an area where population is growing, an increase in employment in an area will attract households seeking work. Some attempts to untangle these interactions have been made using time series data to estimate whether employment growth lags population growth or vice versa (Burns, 1964). However, a more thorough analysis requires the simultaneous modeling of both parts of the system.

Simultaneous Equation Models

In an attempt to model the complex process of growth, Muth (1969) developed a simultaneous equation model of metropolitan area growth. Employment growth in a given SMSA was a function of several variables, including the rate of growth of the labor force. At the same time, labor force growth was a function of the growth of employment, wages, and secular change in the labor force participation rate. By estimating the coefficients, Muth was above to draw some conclusions concerning the relative importance of employment growth and labor force growth.

Another type of model estimated the simultaneous interaction of population and employment relocation using structural simultaneous equation models.[4] These allocate the growth of the entire area among component zones. They are discussed more fully below. The major problems with the application of these models to the analysis of the determinants of growth are that they require detailed data that are often unavailable and considerable time and effort in their construction and estimation.

DEMAND ORIENTED LOCATION MODELS

Location models offer some measures of the factors that affect the *distribution* of employment within a metropolitan area. Unlike growth models, they have little to say about the overall *level* of employment. Corresponding to the derivation of supply and demand driven *growth* models, models of the *location* of economic activity may be separated into those that focus on spatial differences in the level of demand, those that focus on spatial differences in the costs of production, and those that attempt to synthesize elements of both.

Central place models assume that firms face uniform factor prices (wages and land costs, for example) but that they compete with each other for customers and advantageous plant locations. One of the most useful of these models is the central place model, developed by Christaller (1966) and Lösch (1954) and applied and refined by Garrison et al. (1959) and Berry (1963 and 1967), among others.

[4] These have been used primarily at the national level, although Glickman (1971) and Hill (1965) have attempted to apply them to urban areas.

Central place models have been designed to assess the location effects of changes in the cost or quality of transportation services between a firm and its customers. In its simplest form, the model relates employment growth at the employment center of a region to population growth in the "market area" surrounding that center. Williamson and Swanson (1961) demonstrated that positive hinterland population growth was important for urban development during the nineteenth century, and Higgs (1969) found that the rate of urban development in the Midwest was positively linked to the rate of population growth in the surrounding areas. The model has also been used to predict the consequences of a change in shopping trip costs for retail store locations (Marvel, 1976).

The model assumes that production techniques do not change in response to transportation cost changes and that the locations of potential customers are fixed. If each customer decides how much of a given product to buy and which firm to buy it from on the basis of the lowest delivered price (the price at the plant plus the cost of transportation to the customer), then each firm will serve only those customers in the "market area" surrounding its plant. The size of the market area will depend on the density of demand for the product and the cost of transporting it to customers. Since different industries have different densities of demand, economies of scale, and transportation costs, a hierarchy of commercial and industrial centers may develop within a given region, or even within an SMSA. Both small and large commercial and industrial centers will contain plants from industries that have small market areas; the less numerous, large centers will contain plants from industries with larger market areas as well.

A change in transportation costs can change the amount of product demanded in a market area. The change in the costs of transporting inputs or outputs to or from a center affects the delivered prices of goods produced at that center.[5] Since, for most goods, a reduction in price will increase demand, a reduction in transportation costs will usually increase the density of demand in a market area, and vice versa.

If the changes in transportation costs are selective (affecting costs to and from one center but not another), or if there are (dis)economies of scale in production, then the transport cost changes can affect the sizes of the market areas served by centers. For example, reduced transportation costs at a single center will tend to increase production at that center at the expense of neighboring centers. Or an increase in demand that allows an industry to exploit dramatic economies of scale will encourage the industry to relocate its firms from smaller to larger centers. Of course, to the extent that changes in production levels at commercial and industrial centers stem from changes in the size of market areas rather than from changes in the density of demand, one center's production gain is simply another's loss.

In short, the central place models predict that an increase in the cost of transporting outputs from workplaces is likely to bring a decrease in employment at those workplaces. Conversely, a decrease in output transport costs will increase employment. These effects are likely to be stronger if transportation costs change at only a few workplaces. Where there are important (dis)economies of scale in production, however, the direction of employment change at affected workplaces is difficult to predict because firms may shift from one size center to another.

[5] Most models assume that firms are perfectly competitive and, thus, cost changes will always cause price changes.

This model emphasizes markets and transportation costs and therefore ignores all of the location-specific factors that affect the relative attractiveness of alternative production sites. In addition, by assuming that the location of households is fixed, the model ignores the interaction between household and employment location. Although some firms may move to locate near households, it seems likely that households also move to be near their place of work.

SUPPLY ORIENTED LOCATION MODELS

Demand varies spatially and so does the cost of some factors of production. The cost of land, the availability of transportation linkages, and the local pool of labor vary across urban areas. Unfortunately, data at this level of spatial disaggregation are rarely available, and the theoretical models to explain the spatial distribution of input and output prices are at a quite early stage of development.

One approach relates the locational patterns of companies to their input demands and to the characteristics of the locations. Stone (1974) divided the Boston metropolitan area into four concentric rings and ordered them with respect to the cost of productive factors—skilled, medium skilled, and unskilled labor; truck, air, rail, and ship transportation; land; and market and business service orientation. A sample of manufacturing firms in the city was classified according to market orientation,[6] size, and other quantifiable attributes. Differences in the distribution of types of firms in the four zones were measured through a series of cross tabulations. This approach explains differences in locational patterns within a metropolitan area. The models discussed above are rarely able to do this since factor availability and costs do not differ within the region.

A more sophisticated version of the same basic approach is found in the work of Kemper (unpublished) and Leone (unpublished). Kemper took a sample of almost all manufacturing companies relocating within the New York region, characterized them according to their production requirements, and analyzed their location behavior. He then regressed the percent of the total number of firms in each industry relocating in each of five zones, into which he divided the New York SMSA, against the production requirements. His results are summarized in Table 3.1. They indicate the importance of several variables that are discussed more fully in the following section. For example, industries relying on nonstandardized inputs are more likely to locate in the central business district (CBD) (Manhattan below 60th Street) than elsewhere. This is reflected in the positive and significant coefficient estimated for that zone. However, industries that rely heavily on truck transportation are more likely to choose a location away from the CBD and central industrial district (CID)—the regression estimated a significant and negative coefficient for probability of locating in the CBD.

This correlation technique does not provide an analysis of why the changes they measure occur, and it is therefore difficult to derive policy implications. For example, Kemper found that firms paying high average wages were more likely than others to locate in the CBD (a positive and significant coefficient). Does this reflect the higher skills of the labor supply at this location or that other advantages of the

[6] By market orientation, Stone distinguishes companies that are producing goods or services either for the metropolitan region of Boston or for a national market.

Table 3.1

PROPORTION OF INDUSTRY BIRTHS IN FIVE ZONES[a] IN NEW YORK CITY BY INDUSTRY CHARACTERISTICS
(t-statistics in parentheses)

Variable (per $ of value added)	CBD	CID	Core	Inner Ring	Outer Ring
% of output shipped less than 50 miles	0.36	0.30	-0.50	-0.22	0.07
	(1.1)	(1.4)	(2.0)	(0.9)	(0.4)
% of output consumed	0.26	-0.14	0.01	-0.08	-0.04
	(3.7)	(3.1)	(0.1)	(1.5)	(1.1)
Rail transport inputs	-1.90	2.60	-2.33	-0.77	2.26
	(0.6)	(1.3)	(0.9)	(0.3)	(1.5)
Truck transport inputs	-2.26	-1.74	2.32	1.58	-0.01
	(1.1)	(1.3)	(1.5)	(0.9)	(0.0)
Water transport inputs	6.06	3.80	-5.67	-3.28	-0.94
	(0.5)	(0.5)	(0.6)	(0.3)	(0.2)
Air transport inputs	-52.05	-50.15	114.51	-27.89	5.70
	(0.6)	(0.8)	(1.6)	(0.4)	(0.1)
Raw materials inputs	-0.17	0.29	0.03	-0.14	-0.00
	(0.5)	(1.2)	(0.1)	(0.5)	(0.0)
Nonstandardized inputs	0.79	-0.02	-0.40	-0.23	-0.14
	(4.4)	(0.2)	(2.8)	(1.6)	(1.6)
Number of professional workers	1.75	-0.56	-3.84	3.12	-0.36
	(0.9)	(0.5)	(2.7)	(2.2)	(0.4)
Number of craftsmen	-1.09	0.84	-0.42	1.27	-0.55
	(1.1)	(1.3)	(0.6)	(1.7)	(1.1)
Number of operatives or laborers	0.54	0.17	-0.84	-0.31	-0.05
	(2.2)	(1.0)	(1.8)	(1.6)	(0.4)
Number of clerical or sales workers	1.87	-0.39	1.32	-3.09	0.22
	(1.5)	(0.5)	(1.3)	(3.1)	(0.3)
Average hourly earnings	9.78	-4.69	-3.72	-4.93	3.58
	(1.9)	(1.3)	(0.9)	(1.2)	(1.4)
Capital requirement	19.22	-0.50	-2.27	-11.86	-4.50
	(2.4)	(0.1)	(0.4)	(1.9)	(1.1)
Average employment	-0.09	0.14	0.03	0.01	-0.10
	(0.8)	(1.9)	(0.4)	(0.2)	(1.7)
Concentration ratio	0.04	0.10	-0.01	-0.10	-0.03
	(0.5)	(1.7)	(0.1)	(1.4)	(0.7)
Intercept	-70.92	19.40	70.84	69.08	11.14
R^2	.42	.11	.11	.27	.11
Standard error	26.32	17.86	20.64	20.88	13.29
F-statistic	11.9	2.0	2.1	6.0	2.0
Number of observations	280	280	280	280	280

SOURCE: Peter Kemper, *Manufacturing Location, Production Requirements, and Market Characteristics*, National Bureau of Economic Research, New York, unpublished.

[a]Zone definitions:
CBD: Manhattan below 60th Street.
CID: West Kings County.
Core: Remainder of Manhattan and Kings Counties, Bronx and Queens Counties.
Inner Ring: Richmond, Westchester, and Nassau Counties.
Outer Ring: Suffolk, Rockland, and Dutchess Counties.

location allow firms to pay workers enough to reflect the higher commuting costs? Second, many of the models have been developed for one city or region, and it is unclear to what extent the results can be generalized. Finally, the data required for this type of analysis are rarely available.[7]

GENERALIZED LOCATION MODELS

Simultaneous Models[8]

There have been a number of attempts to synthesize the intraregional location models to include both demand and supply factors. Models have been constructed that allow for the simultaneous determination of place of work and residential location within an urban area (Steinnes, 1977; Steinnes and Fisher, 1974). They are similar to models used at the national or regional level having structural simultaneous equations derived on the premise that location of employment and residence are simultaneously determined by economic variables and certain exogenous factors. The distribution of employment by industrial categories over geographic subareas is determined by variables of two types: those affecting the level of demand for labor in the same area as that of the employment being examined, and those affecting the supply of and demand for residences in neighboring or accessible areas. Similarly, the distribution of residents by occupation and race categories is explained by exogenous variables that affect the supply of and demand for residences and by the demand for labor in accessible areas. The simultaneous model was tested against ordinary least squares estimation. Significant differences were found in the sign and importance of certain variables, indicating the importance of the type of model used to explain employment distribution.

Multiple Workplace Models

A few researchers, including Solow (1973) and White (1974), have developed models of urban areas shaped around multiple workplaces. Workers are employed in the suburbs as well as in the central production area, and the suburban and central areas of the metropolis compete with one another for customers, although not with other metropolitan areas. These models place primary importance on transportation costs. Changes in commuting costs to a production area may affect the comparative advantage of that area and, thus, employment. A change in commuting costs will alter the amount of time or money workers must spend in commuting and therefore will affect the real income of the workers in that area. This in turn may change the minimum wage employers in that area must pay to attract workers. A decrease in commuting costs may allow employers to reduce wages, improving their position relative to competitors in other production areas, and an increase in commuting costs would force them to increase wages, deteriorating their competitive position.

Some of the effect of the change in commuting costs is passed on to residential landowners in the form of land rent changes. Changes in the rent for residential

[7] Kemper used data collected by Dun and Bradstreet.

[8] This discussion is based upon unpublished research by Gómez Ibáñez.

land immediately surrounding the production area may influence the comparative advantage of that area by changing the cost of acquiring additional land for expanded production. Reduced commuting costs will lower the rent of the residential land adjoining the production area and make expansion cheaper. Increased commuting costs will raise adjoining rents and, thus, the costs of expansion. The effect of commuting cost changes on employment may be diminished by changes in land rents in the production area itself. The more elastic the demand for the area's products and the fewer opportunities to substitute labor or other factors for land in the production process, the more likely that landowners in this production area will reap the benefit of any transportation improvement (Getz, 1975).

These models offer some useful insights into the process of employment location and relocation within an urban area. However, they are complex to construct and demand data that are not available for all cities. They take the overall level of employment as determined exogenously, even though many of the factors that affect the location of businesses will affect the level of employment as well. The models also omit a number of important variables, including environmental factors. Berry and Neils (1969, p. 485) summarize the disenchantment with location models:

> Many of today's urban theorists find solace in models of urban systems and city structures constructed on unbounded uniform plains, and delight in the beautiful tessellations of the central-place hierarchy and graceful distance-decay patterns. For them, environmental issues are conveniently sidestepped.

Mills (1967) and Margolis (1967) both stress the importance of externalities, imperfections in the land market, the long life of private and social capital, and multiple employment centers in location decisions. More important than how much a city conforms to the basic access model are how much and why it does not conform.

OTHER TECHNIQUES

Alternative techniques to examine the processes of growth and location include shift-share analyses, developed to disaggregate the growth in employment into a number of different components, and surveys of plant managers to determine what factors they believe to be important in their location decisions.

Shift-Share Analysis

The shift-share technique used by Fuchs (1962), Perloff et al. (1963), Ashby (1964), and Nelson and Patrick (1975) is a good example of an approach that describes the complex changes in economic development. This method adjusts for the differences in industrial structure among regions in computing regional growth. The adjusted gain or loss in manufacturing, m, in state s, is computed from the formula

$$M = \tfrac{1}{2}\left(\frac{Y_s \sum_i X_{si} \frac{Y_{\cdot i}}{X_{\cdot i}}}{Y_s} + \frac{\sum_i Y_{si} \frac{X_{\cdot i}}{Y_{\cdot i}} - X_s}{X_s}\right),$$

where X_{si} = economic activity (e.g., employment) in initial year of industry i in state s;
$X_{s.}$ = economic activity in initial year of all industries in state s;
$X_{.i}$ = economic activity in initial year of industry i in the United States;
$X_{..}$ = economic activity in initial year of all industries in the United States;
Y_{si}, $Y_{s.}$, $Y_{.i}$ and $Y_{..}$ = the economic activities in the terminal year.

The reasoning behind this approach is that a state might expect to grow at a rate governed by the weighted sum of the national growth rates of its component industries. Differential growth rates among regions that occur as a result of different national growth rates among industries are not really related to changes in the comparative attractiveness of a region. They are due only to the industrial structure of a region.

The importance of regional factors can only be assessed against *adjusted* regional growth rates. Fuchs found that structural differences explain little of the variation in growth rates among regions and that most of the variation is due to differences in the performance of a given industry in different locations. This information is useful in formulating explanatory models since it emphasizes regional differences in the price and quality of productive inputs rather than differences in industrial structure. This statistical technique does not analyze the reasons for changes. However, by providing a disaggregated measure of growth, it does allow insights into the reasons for regional variations.

Surveys of Plant Managers

Industrial location surveys usually ask managers to assign priorities to a list of potentially relevant factors or to choose a subset of the factors that were or would be important to the firm in making a location decision and then to derive weights by the frequencies with which factors are mentioned. Surveys can identify important factors that do not lend themselves easily to quantification. They have been frequently used by local industrial development agencies to identify industries that might be attracted to their locality (Weinstein, 1977).

The pioneering work of McLaughlin and Robok (1949) provided a framework that many other studies followed. They studied 88 companies in 13 southern states and hypothesized that the location decision could be divided into two distinct steps: In the first, a company would select a region based upon such broad considerations as the size of the market, the availability of raw materials, and the supply of labor. In the second step, the company would select a site within the region based upon convenient highway linkages, the quality of local public services, taxes, or the presence of supporting business services and supplying industries.

The results of two surveys reported by McMillan (1965) are shown in Tables 3.2 and 3.3. The first survey reports the results of very broad questions, corresponding to factors relevant in the first stage of the decision process. The relative importance of labor, markets, and raw materials attests to this. The second shows more local factors. Taxes are much more important on this list than they are in Table 3.2.

The largest survey was conducted by the Economic Development Administration (EDA) (1971). A total of 2616 usable responses were received. The questions

Table 3.2

ORDERING PLANT LOCATION DETERMINING FACTORS

Factor	1st	2nd	3rd	4th	5th	Total Points	Percent Weight
Market	118	44	35	24	13	928	18.9
Labor	33	78	45	34	31	711	14.5
Raw materials	73	36	18	17	8	605	12.3
Building	26	28	29	15	9	368	7.5
Site	18	30	22	14	25	329	6.7
Transportation	14	32	32	31	22	378	7.7
Distribution	10	25	37	31	20	343	7.0
Living conditions	14	11	29	35	35	306	6.2
Climate	11	8	11	22	25	189	3.9
Industrial fuel	3	12	20	14	14	165	3.4
Water	3	7	12	10	8	107	2.2
Industrial power	0	3	14	15	11	95	1.9
Financial help	8	7	7	7	5	108	2.2
Taxes	5	5	3	14	22	104	2.1
Laws and regulations	1	2	5	6	14	54	1.1
Miscellaneous	15	5	2	1	4	107	2.2

SOURCE: Survey by Industrial Economics Research Division, Texas Engineering Experiment Station, Texas A&M University, October 1954, reprinted in T. E. McMillan, "Why Manufacturers Choose Plant Location vs. Determinants of Plant Locations," *Land Economics*, Vol. 41, 1965, pp. 241. Reprinted by permission of the *Journal of Land Economics*.

covered a broad range of topics, from community size preferences to public services and relocational objectives. The results are disaggregated by five-digit Standard Industrial Classification (SIC). The summary for the total number of plants is reproduced in Table 3.4. Some of the results are discussed in detail in Sec. IV.

A great deal of caution must be exercised in the derivation of policy implications from the results of questionnaires or surveys. For example, in the EDA survey, the most important community attributes (those most often cited) are fire and police protection. This does not imply that a community wishing to attract industry should place a priority on upgrading the quality of these services. Industries may be insensitive to changes in the quality of these services but are merely concerned that the local jurisdiction provide some fire and police protection. Such services may represent a necessary but not a sufficient condition for attracting a firm to an area.

CONCLUSIONS

Perhaps the most important conclusion that emerges from this brief review of growth and location models is that no one model includes all the elements necessary to perform an analysis of the effects of federal policies on industrial development. Each technique emphasizes one aspect of the growth or location process. The absence of a "world model" is due to the lack of data for many of the factors that would be expected, a priori, to exert a powerful influence on the course of local

Table 3.3

WEIGHTING OF PLANT LOCATION DETERMINING FACTORS

Area of Interest	% Respondents Indicating Significant Importance
Trucking	76
Reasonable cost of property	67
Reasonable or low taxes	65
Ample area for expansion	63
Favorable labor climate	62
Favorable attitude of community and residents to industry	57
Nearness to present sales area	56
Reasonable cost of construction	53
Favorable climate for personnel	50
Availability of labor skills	48
Near sources of raw materials	42
Need for plant to service new or expanding area sales	42
Favorable political climate toward business	40
Pleasant living conditions	39
Commercial services	37
Rail facilities	35
Zoning restrictions	34
Cost of living and economic conditions	34
Labor rates	33
Educational facilities	32
Favorable climate for production processes	30
Inexpensive fuel or power	29
Public transportation	29
Recreational and cultural facilities	25
Water supply	22
Waste disposal	21
Near airport	20
Topography	8
Water transport	8

SOURCE: McGraw Hill, *Plant Site Survey, A Study Among Business Week Subscribers*, 1964, reprinted in T. E. McMillan, "Why Manufacturers Choose Plant Location vs. Determinants of Plant Locations," *Land Economics*, Vol. 41, 1965, p. 242. Reprinted by permission of the *Journal of Land Economics*.

Table 3.4

SURVEY OF INDUSTRIAL LOCATION DETERMINANTS

		Yes	No	No response
I.	New or Expanded Manufacturing Plants Firms with tentative plans to expand existing facilities or establish plants at new location between 1971-1975	27	70	4
II.	Location of New or Expanded Establishment (Respondent could select more than one preference)			
	A. Geographic preference:			
	(1) Central city of a metropolitan area	6	70	24
	(2) Metropolitan suburban area	45	36	19
	(3) Nonmetropolitan area	49	32	19
	B. Industrial park preference	43	39	18
III.	Community Size Preference (Community includes city and surrounding areas)			
	(1) Under 25,000 population	20		
	(2) 25,000-49,999	18		
	(3) 50,000-99,999	18		
	(4) 100,000-249,999	17		
	(5) 250,000-499,999	8		
	(6) 500,000-999,999	7		
	(7) 1,000,000 or more	10		
	(8) No response	3		
IV.	Plant Site Size Preference (Plant site includes total land area including physical facilities, parking, outside storage, etc.)			
	(1) Less than one acre	1		
	(2) 1-4 acres	16		
	(3) 5-20 acres	53		
	(4) 21-50 acres	16		
	(5) 51-100 acres	6		
	(6) Over 100 acres	5		
	(7) No response	2		
V.	Approximate Number of Employees at Fully Operational New or Extended Plant			
	(1) 500 or more employees	16		
	(2) 250-499 employees	26		
	(3) 100-249 employees	40		
	(4) Under 100 employees	15		
	(5) No response	2		

Table 3.4 (CONTINUED)

		A	B	C	D
VI.	Community Attributes Considered in Plant Location (Community attributes will be rated based on importance to respondent: A) of critical value; B) of significant value; C) of average value; D) of minimal value)				
(1)	Air passenger service	11	17	36	33
(2)	Local industrial bonds	3	14	23	55
(3)	Vocational training facilities	2	22	42	30
(4)	Higher educational facilities	1	14	41	39
(5)	Tax incentives or tax holidays	8	38	32	19
(6)	Fire protection	43	30	20	3
(7)	Contract trucking	30	28	21	16
(8)	Public warehousing	1	5	17	73
(9)	Public refrigerated warehousing	0	0	2	93
(10)	Police protection	28	27	37	5
(11)	Local industrial development group	3	15	42	37
(12)	Pool of trained workers	18	35	35	9
(13)	Pool of unskilled workers	17	29	35	15
(14)	Lenient industrial zoning	6	23	49	19
(15)	Strict industrial zoning	3	14	45	34
(16)	Community population, as preferred in Item III	5	26	52	12
VII.	Plant Site Features (Rating scale same as Item VI)				
(1)	Highway access (within 30 minutes of major highway interchange	37	39	17	3
(2)	Scheduled air freight service	12	25	31	28
(3)	Water transportation	3	5	9	79
(4)	Scheduled rail service	23	17	22	34
(5)	Piggy back facilities (rail)	5	12	25	54
(6)	Industrial water supply (processed)	23	22	29	22
(7)	Industrial water supply (raw)	16	17	27	35
(8)	Natural gas service	31	27	25	13
(9)	Industrial sewage processing	20	26	32	18
(10)	Solid waste disposal	17	25	35	20
(11)	Soil load-bearing capabilities	14	22	35	24
(12)	Plant site size, as preferred in Item IV	23	39	30	5

VIII.	Locational Objectives To Be Achieved (Percentage of firms selecting item. Respondent could select as many as three objectives.)	
(1)	Improvements in transportation efficiency or economy	45
(2)	Availability of larger parcel of land	25
(3)	Closer proximity to resources and/or major suppliers	31
(4)	Closer proximity to other plants of your company	11
(5)	Closer proximity to your distributors and/or your customers	49
(6)	Closer proximity to other firms in same or related industries	2
(7)	Ability to serve new and/or expanded markets	59
(8)	Minimize competition from other plants for labor force	33
(9)	To secure factors of location unique to your industry (special energy requirements, etc.)	10

SOURCE: Economic Development Administration, *Survey of Industrial Location Determinants*, U.S. Department of Commerce, 1971.

economic development and to the complexity of the growth and location processes themselves.

The analysis of factors affecting industrial location and development must draw upon the results of studies using many different techniques. This makes it difficult to weigh the relative importance of individual factors of production, since their roles have been identified through different models.

Models relevant to this analysis may be divided into two types, both of which derive from the theory of the firm. Growth models attempt to explain the rate of increase of output, income, or employment but have little to say about the spatial distribution of economic activity within a region. They may be divided into factor supply, demand, and more general models. Simultaneous equation growth models offer a number of opportunities for refinement and development, which may lead to a more thorough understanding of the growth process and of the interarea shift of population and employment

Location models, derived from the location theory of the firm, may be categorized similarly. Some focus on the spatial variations in demand, some focus on spatial variation in factors affecting production costs, and some attempt to include elements of both. Location models, in general, assume that the aggregate level of employment is given exogenously. Some recent complex urban simulation models include both the determination of the level of regional output and the allocation of that employment among subareas. These models are estimated for individual urban areas and may not yield many general conclusions. They do, however, increase understanding of the process of urban development. Further theoretical research and the improvement of urban data bases are necessary before the factors that affect the process of urban development can be properly understood.

IV. THE DETERMINANTS OF INDUSTRIAL LOCATION AND DEVELOPMENT: EMPIRICAL RESULTS

This section reviews some of the empirical evidence that has been collected concerning the multitude of factors that affect the path of local economic development through the wide variety of analytic techniques documented in Sec. III. Some studies have analyzed employment change in states and some in cities, and some have examined the behavior of individual firms. The interpretations of the results have also varied considerably.

For organizational simplicity, factors that influence growth and development are separated into three types: those that affect the demand for output; those that affect the cost of production at a particular location; and a less tangible group of amenities that may affect the attractiveness of a particular location as a place to live and do business, such as air quality, recreation facilities, and crime rate. These last may affect the local market and local costs, but they do so less directly than the other factors. A list of the factors included under each heading is shown in Table 4.1. Some factors fall into more than one category. For example, transportation costs enter into the determination of both the cost of factors of production (through the cost of bringing inputs to the plant) and the level of consumer demand (through the cost of carrying the output to the purchasers).

Table 4.1

FACTORS AFFECTING INDUSTRIAL GROWTH AND DEVELOPMENT

DEMAND
- Consumer Market—population and income
- Intermediate Market—interindustry linkages

INPUT COSTS AND AVAILABILITY
- Transportation
- Labor—size of force, skill level, wages, productivity, unionization
- Land
- Raw materials
- Energy
- Finance
- Taxes and municipal services
- External economies—scale and agglomeration

LOCAL CHARACTERISTICS
- Amenities
- Leadership

LIMITATIONS

It is extremely difficult to separate the effects of different factors and to weigh the factors according to the relative strengths of their effects upon changing patterns of economic activity. For example, it seems probable that one factor in the rapid expansion of manufacturing activity in the South was the extension of the federal highway system into areas of declining agricultural employment where there was a ready pool of surplus labor. Should the rapid growth in that region be attributed to reduced transportation costs or to low-cost labor? The introduction of air conditioning for manufacturing plants may also have stimulated economic development in the South. How should the growth rate be attributed among these three factors?

Second, there are probably interactions among factors of production. For example, the amenities—climate, recreation facilities, low crime rate—may exert an independent influence on the path of development, as does the availability of labor. However, when a location offers both plentiful labor and a high level of amenities, the joint effects of these factors may exceed their sum. Traditional production functions often assume a multiplicative relationship between factors of production and the level of output,[1] yet almost all the studies of industrial location estimate the relationship between output or employment and productive inputs in a simple linear model. Few attempts have been made to identify interaction effects.[2]

A third problem is that factor prices may not accurately reflect the costs and quality of those factors available to local businesses. For example, an index of labor wages does not measure the skill of the labor force or the hiring costs and training costs that the firm must incur. This problem is discussed more fully below.

Fourth, many factors are omitted altogether from research on industrial growth and location, perhaps the most important being the cost of capital. Data from which to estimate the cost or availability of capital are limited.[3] Other omissions include measures of the availability of public services, including fire and police protection, garbage disposal, and water treatment facilities. Detailed estimates of the tax burden by industry are included only rarely.

Finally, information concerning the inputs and outputs of industries is not complete. Through the *Censuses of Manufactures, Wholesale and Retail,* and *Selected Services,* input data are only available for manufacturing industries; therefore, most research has examined manufacturing employment and location. The quality of the data is uneven. Other major sectors—transportation, wholesale and retail, finance, insurance and real estate, and personal business services—have received less attention, although they account for more than 70 percent of nonagricultural employment. The appendix contains a discussion of data problems.

Interpretation of the considerable volume of empirical results and reconciliation of apparent conflicts require the use of judgment and intuition as well as more rigorous analytical tools. The primary empirical results are discussed below. The order in which the following factors are treated does not necessarily reflect their relative importance.

[1] For a summary of such models, see Hahn and Matthews (1966).

[2] One exception in this regard is the work of Wheat (1973), discussed below.

[3] There have been some attempts at approximation. The cost of construction has been used as a measure of the local cost of capital equipment. Harris and Hopkins (1972) and Segal (1976) use the value of capital equipment in place as an independent variable.

CONSUMER MARKET

The local consumer market for a commodity is defined by a wide variety of local population characteristics:

- The costs of transporting the commodity to consumers,
- The number of consumers,
- The level of real income,
- The distribution of income,[4]
- The costs of other goods and services.[5]

A number of other factors are also relevant but are more difficult to quantify. State and local taxes affect disposable income, as do the level of transfer payments (welfare, social security, and other transfers that do not enter directly into income data). Climate may affect the demand for some goods; more umbrellas per capita are sold in Portland, Oregon, than in Phoenix, Arizona; more air conditioners are sold in Phoenix. Differences in taste among regions will also account for some of the variations in demand.

Separating the influence of the level of demand on employment in an area presents considerable problems. The size of the local population, often used as a measure of demand, also measures the availability of labor. Demand, output, and employment interact in a complex way as shown in Fig. 4.1. A growth in local population leads to an increase in labor supply and in the demand for output, leading to an increase in demand for labor. The growth in labor demand stimulates the increase in population as migrants arrive seeking jobs. As employment increases, so does local income, which stimulates a further increase in demand (the multiplier effect). Within this dynamic system it is difficult to determine the extent to which the growth in market demand stimulates the growth in employment or whether the growth in employment opportunities attracts people.[6] Undoubtedly, the relative strength of the two effects differs from place to place. Retired persons seeking the sun in Phoenix or Miami are little interested in jobs, although their purchasing power has attracted businesses to these cities. Many of the autoworkers in Detroit were attracted by the job opportunities.

Market Growth and Employment Growth[7]

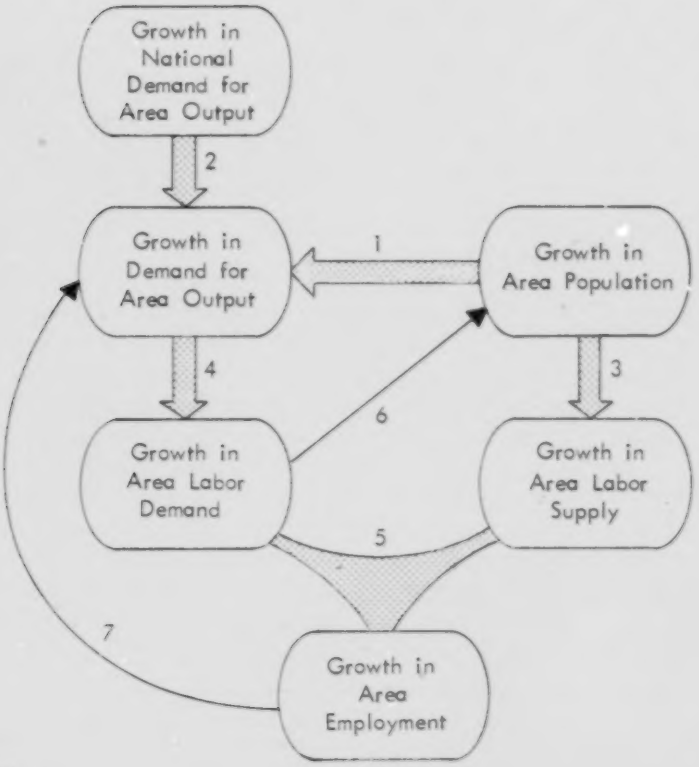
There is considerable evidence that growth in employment follows rather than leads growth in population. Of 22 industries examined by Burrows, Metcalf, and Kaler (1971), previous population growth was significantly related to employment growth in all but one case. A doubling of population over a ten-year period was estimated to lead to an employment level 2.72 times larger in the succeeding period than it would have been with zero growth.

[4] Consumption patterns differ markedly with income. For any given industry, what may be important is the number of consumers within certain given income groups rather than the total local population level.

[5] This affects the amount of income that consumers will have left over to purchase the output of the industry. The more money that must go toward rent, the less that will be available for the purchase of clothing or television sets.

[6] This issue is discussed in the *Population and Residential Location* report.

[7] A discussion of the complex relationship between the movement of people and jobs is contained in Burns (1966). The principal factors affecting the migration of population among areas are discussed in the *Population and Residential Location* report.



LINKAGES

1. Population growth leads to expanded local market for goods and services and increased size leads to increased import substitution.
2. National growth leads to expanded local market for goods and services.
3. Population growth leads to increased local labor supply.
4. Increased demand for local goods and services leads to increased demand for labor.
5. Increased labor demand and supply lead to increased output.
6. Growth in demand for labor encourages population inmigration.
7. Increased output leads to increased local income causing an increase in local demand.

Fig. 4.1—The relationship between population, labor force, and employment in a local area

Thompson and Mattila (1959) found that the correlation between absolute growth in manufacturing employment (1947-1954) and previous absolute population growth across states (1940-1947) was +.90, and that the correlation between manufacturing growth and previous absolute income growth (1940-1947) was +.87. Correlations between population growth (1947-1954) and previous employment growth (1940-1947) were lower, implying that population movements may precede job movements. Wheat (1973) concludes that previous population growth acts to stimulate employment growth by creating a growing market. Polzin (1976) studied the employment patterns of retail activities in 109 SMSAs; one might expect this sector to be heavily influenced by demand. However, he concluded that the relationship between population and retail employment was influenced by both cost and demand conditions and there was no fixed relationship. He found (p. 449) that "a given percentage change in population would have a greater impact on sales in small rather than large cities." However, population growth also leads to an increase in the local labor force, which may encourage firms to move toward the region. These results do not indicate whether consumer demand or labor supply is exerting the dominant influence.

Relative Importance of Markets

There is some consensus that differences in the the growth of local markets have been the single most important factor in differences in local employment growth rates. Perloff et al. (1960, p. 44) concluded that since 1950, markets "operate as the dominant lo(.tional force in the economy." Supporting evidence came from rank correlations between population level and employment in certain manufacturing industries across states. Market oriented industries such as printing and publishing achieved correlations of +.93, while more resource-oriented industries were lower—+.58 for lumber and wood products, +.63 for leather, and +.69 for petroleum and coal products.

A number of studies have placed the fraction of employment that is market-oriented at about half of total employment. McLaughlin and Robok (1949) estimated that 49 percent of all relocating companies were primarily concerned with locating near their markets. Lichtenberg (1960) placed the figure at 43 percent. McCarthy (1963) found that 59 percent of the respondents to his survey were primarily market oriented, and Wheat (1973) concluded that between 55 and 75 percent of the variance in absolute employment growth among regions and between 35 and 55 percent of the variance in per capita growth could be explained through differences among regions in the rate of growth of their markets. McMillan (1965) found that markets were the most important single variable (see Table 3.1 above).

Wheat's measure is interesting since he attempted to examine the interactions among explanatory variables. Climate and market interacted; thus, temperature-weighted market and wage variables could explain a considerable amount of the variance in growth, even after the independent effects of the individual variables had been accounted for. He summarizes (p. 190):

> The market-climate interaction effect is easily the most important. Many market-oriented firms apparently insist on locations that are not too northerly. The rule: the closer you can get to the market, the better—unless winter gets too rugged.

Population movements and climate may account for at least half of the variation in regional growth rates. Rising real incomes, the introduction of air conditioning, and the construction of the necessary social overhead capital have allowed the South and West to attract many Northeastern families. These factors are beyond the direct control of local and federal governments.

The evidence for the importance of previous population growth in determining employment growth is not as strong as the assertions reported above seem to indicate. None of the models attempted to estimate the relationship simultaneously, to determine whether the growth in employment in an area attracted inmigrants or vice versa. From a study of migration toward the Pacific Coast states, Gordon (1959, p. 495) concluded that, "Changes in net migration [tend,] for the most part, to lag somewhat behind changes in employment." However, Bright and Thomas (1941, p. 773) decided that the reverse was true and that "an important part of the migration to California has been of a hedonistic character rather than a primarily economic character and has been motivated more by climate and legend than by superior job opportunities." This importance of amenities (discussed below) rather than of jobs was also stressed by Ullman (1954). Perloff et al. (1960, p. 471), summarized the issue in this way:

> The economic opportunity offered by expanding employment and relatively high per capita incomes was largely responsible for the population growth —and the population growth, in turn, generated new employment opportunities. To some degree, however, population seems to have served as an independent stimulus to growth. . . . This suggests that the amenities of coast and climate have been a direct stimulus to population growth—for example, by attracting retired persons *with income*—and hence, to regional development.

However, Burns and Mittelbach (1963) found that the percentage of persons aged 65 and over in 1960 in Los Angeles or in California as a whole was not significantly higher than in all SMSAs or the nation as a whole. The aged also te ded to have very low incomes. Burns (1964) found that, in relating quarterly employment changes to quarterly population changes, the highest coefficient of determination was achieved with no lag between the two series—that is, with an instantaneous adjustment between job opportunities and population increase.

There is some evidence that regional shifts in employment may have been due to previous population shifts, as well as that some population shifts have followed the redistribution of employment opportunities.

There is also some evidence that jobs have followed people to the suburbs. Using pooled cross-sectional and time series data for 15 SMSAs, Steinnes (1977, p. 76) found that for both manufacturing and service jobs, businesses followed household location rather than the reverse. In fact, he found that people tended to move away from manufacturing jobs, presumably because of pollution or other disamenities. He concluded that "the efforts of central cities to attract and retain manufacturing may be accelerating, not retarding the flight of residents from the city."

INTERMEDIATE MARKETS

The level of employment in their principal buyers is an important locational determinant for industries whose chief market is other industries. In addition, the

presence of industries that provide vital inputs will make an area attractive to some industries. In a detailed analysis of output growth in 84 industries across countries, Harris and Hopkins (1972) found that 32 industries[8] were significantly influenced by the output growth of major customers. For example, the petroleum refining industry tended to locate close to the petroleum extraction industry (a major supplier), and the metal containers industry tended to locate near the beverages industry (a major buyer). A lower number of industries responded strongly to a growth in local consumption expenditure.

The extent to which an industry is affected by intermediate markets clearly depends upon the relative importance of suppliers and buyers and on the transportation costs involved. These linkages may have important relevance for policy. For example, if a local municipality succeeds in attracting some firms to an industrial development area, it may improve its chances for attracting more companies by seeking additional firms in industries that are strongly linked. Similarly, if a federal policy has been identified as influencing the location of a specific industry, the full effects can be better understood if linked industries are known. Linkages can be identified through input-output tables.[9] The costs of transporting inputs and outputs are also important. Two industries may be very strongly linked in terms of buying and supplying inputs but are able to locate a considerable distance apart because of the low cost of transporting the commodity.

An alternative approach to identifying locational linkages has been used in research conducted at the Urban Institute (Bergsman, Greenston, and Healy, 1972 and 1975). In this research, correlations between employment levels in three-digit and four-digit SIC industries across SMSAs were calculated and factor analysis used to construct groups of industries that clustered together. The grouped industries are not strongly linked by interindustry shipments identified through input-output tables, implying that transportation costs rather than the level of interindustry purchases determine spatial grouping.

TRANSPORTATION

Transportation costs affect both the revenue a firm receives from its sales and the prices it must pay for its inputs. It is difficult to separate these two components in most of the studies that have been conducted. Lichtenberg (1960) estimated that 51 percent of manufacturing industries were sensitive to changes in transportation costs. Of these, 84 percent were transport-sensitive to the costs of transporting commodities to consumers, and only 16 percent were sensitive to the costs of transporting inputs. Harris and Hopkins (1972) also found that more firms were sensitive to output transportation costs than to input transportation costs. This may be attributable to the fact that firms are able to adapt their production techniques to changes in relative factor costs. In areas where transportation costs are high, a firm may be able to reduce its input transportation costs per dollar of value added by purchasing inputs already processed rather than buying raw materials and processing intermediate goods itself. There are fewer options available to reduce

[8] Identified as groups of three-digit and two-digit SIC industries. They identified 85 sectors in all.

[9] *Input-Output Structure of the U.S. Economy: 1967*, Vol. 1, U.S. Department of Commerce, Washington, D.C., 1974.

output transportation costs. A survey by the Fantus Company, Inc. (1966), specialists in the industrial location process, placed transportation costs first among the factors considered in location choices. In general, firms whose product embodies a high value added per ton or per cubic yard—for example, electronics companies—will be less sensitive to transportation costs than other firms. However, they may be very sensitive to the quality of transportation services, including the speed of delivery, the likelihood of damage, and the possibility of larceny. Some of the switch of high-value freight from railroads to trucking may be a result of quality differences betweem them.

Final Product Transportation

Costs of transporting commodities to consumers have been affected by the rapid growth of trucking. The share of trucking in total freight transportation has risen from 9.5 percent in 1940 to 21.3 percent in 1970. If the volume carried by oil pipelines is ignored, then the change is from 10.5 percent to 27.0 percent, the increase coming almost entirely at the expense of the railroads. Truck transportation reduces the cost of small-load short-haul freight movements relative to large-load, long-haul movements (Chinitz and Vernon, 1960) and has led to decentralization of industries as firms moved toward highway linkages and away from railheads. The growth of trucking has also increased the tendency for firms to locate near the market for their products. Cities whose businesses use short-haul, small-load transportation[10] and can relocate wherever there are trucking facilities will experience more rapid loss of employment than cities whose industries rely on heavy-load, long-haul transportation.[11] The iron and steel industry has probably not experienced extensive relocation in response to transport cost changes.

Many older cities that had developed around rail terminals are ill-equipped to make the transition to truck transportation. Building densities are high and access inadequate. Congestion is heavy and parking spaces and truck terminals too few and too small. Firms may have moved away from older cities to escape these problems. Boston, New York, Baltimore, and Philadelphia, which have traditionally housed a large number of small firms whose products are fairly transportation-intensive—for example, apparel—have been unable to compete with newer, truck-oriented cities.

Input Transportation Costs

Input transportation costs will have effects similar to those of final commodity transportation costs. That is, the growth in trucking has led to decentralization of employment. In addition, the rapid growth in the use of private automobiles for commuting to and from work has increased the cost of transporting labor to work relative to the cost of transporting materials (Moses and Williamson, 1967). When the transportation costs of materials were of prime importance, companies located on railroad spurs in the central city. With the increase in labor force commuting

[10] These industries may include apparel, food processing, printing and publishing, and specialized durable goods.

[11] These industries may include primary metals and heavy equipment.

costs, companies have tended to relocate closer to their labor supply.[12] For companies requiring skilled labor, this will mean a move to the suburbs. Companies requiring unskilled labor, which is less mobile than skilled labor, will tend to remain or relocate within the city because of the availability of public transportation for their workforce. Chicago companies surveyed by Hartnett (1972, Tables 3.2 and 3.3) placed a high value on accessibility to a large, unskilled labor pool and, therefore, implicitly upon public transportation. The strong positive effect of high labor requirements per dollar of value added on the probability of a firm locating in the CBD rather than in the suburbs, found by Kemper (unpublished Table 3.1), provides further evidence of this.

The shift of freight transportation from railroads to trucking has been a significant force in the suburbanization of employment and perhaps even in the move of companies from the old manufacturing belt to new regions.[13] However, causation may also run in the reverse direction. The change in methods of transportation may result from company relocation that occurred from other causes. A firm that moves to a suburban location or to a new industrial site in the South may be forced to change from rail to truck transportation since suburbs and new sites in the South are generally better served by highways than by railways. It is difficult to separate these two effects.

LABOR

Labor is the most important single factor of production. Nearly half of the value added in manufacturing in 1972 was spent on payrolls. Two-thirds of these payrolls were for production workers. Among the many dimensions of the labor input into the production process that are relevant to the industrial growth process and location decisions are:

- *The size of the unskilled labor market pool.* A company that experiences considerable seasonal or cyclical fluctuations in demand may find it useful to be located in an area with a large labor pool so that it can hire easily in times of need (the apparel industry in New York is one example). Companies tend to lay off unskilled workers during a recession more readily than skilled workers (Vernez et al., 1977, Sec. VIII).
- *The skill level of the labor force.* Training labor can be expensive, so an area that already has a supply of skilled labor will be an attractive location.
- *The wage level.* The price at which labor of a given skill is available is important.
- *Unionization.* It has been argued that companies move to avoid high wages and expensive working conditions imposed by powerful unions.
- *Racial composition of labor force.* It has been argued that companies relocate to avoid having to hire minority employees—a business parallel to the alleged residential "white flight."

[12] The incentive to do so comes from the fact that a company moving to the suburbs may offer its workers lower wages since the work force will spend less time traveling. If the work force is unionized so that wages are equalized throughout the metropolitan area, no such saving will be enjoyed (although the company may find it easier to hire in the suburbs).

[13] The shift of some firms to other regions may be a result of transportation rate regulation. This is discussed in Sec. VI.

Size of the Labor Pool

Summarizing the results of a survey of companies located in Chicago, Hartnett (1972, p. 35) concluded that:

> The 705 study firms located and/or remained within the City of Chicago because, among their particular industrial location requirements, they placed a high priority on labor availability. . . . The suburban firms interviewed reinforced the assumption that the City of Chicago is better endowed with supplies of labor than is the suburban portion of the Chicago SMSA. . . . Among all the locational factors, labor availability was paramount.

This finding is reinforced by the statistical analysis of Kemper (unpublished), who found that labor-intensive companies were much more likely to locate in a CBD than in a suburban area (see Table 3.1). Struyk and James (1975) found that low-wage companies tended to locate in low-income neighborhoods in the city.[14] Availability of a pool of unskilled workers is probably important to labor-intensive, low-wage industries and appears to distinguish central city areas from suburban locations.

The availability of a pool of labor may reduce operating costs of businesses over time by reducing the need for labor hoarding. When a company experiences a decline in orders during a cyclical downturn, resulting in underemployment in its workforce, it does not immediately dismiss workers. A firm may avoid a number of costs by maintaining a "reserve labor force" during economic slowdowns, including turnover costs that would otherwise be incurred at the beginning of the next economic recovery: advertising for prospective employees, interviewing and selecting new workers, and training new personnel. There is some empirical evidence of this behavior (Miller, 1971; Clark, 1973). Where there is a large pool of unemployed, the company may be able to maintain a smaller reserve labor force because it will find that workers it lays off during slowdowns will be available for rehiring during the recovery. The fact that central cities suffer a higher rate of unemployment than their suburban areas has probably attracted labor-intensive firms for this reason.

Although the size of the unskilled labor pool is correlated with the average rate of unemployment, it is not immediately apparent whether new companies are attracted by the pool of labor or the pool of labor is attracted by local employment growth. In one of the few attempts to separate the effects of labor migration on employment growth from the effects of employment growth on migration, Muth (1968) devised a system of simultaneous equations in which the migration of labor was a function of local employment opportunities and, at the same time, growth in employment was a function of the availability of labor. He concluded, from an estimation across large SMSAs, that there was a greater tendency for jobs to follow labor than for labor to follow job opportunities. This reinforces the importance of previous population growth in encouraging employment growth.

Labor Skill and Regional Employment Shifts

Differences in the skill levels of regional labor forces may be related to regional employment shifts. Growth in manufacturing employment has been most rapid in

[14] They also found that some high wage companies were located in poverty areas and were growing rapidly. These tended to be nuisance industries, emitting air or noise pollution.

those areas in which the productivity of labor per dollar of wages was highest. However, differences in regional growth rates have been associated with a narrowing of interregional productivity differentials—rapidly growing regions have experienced a decline in their relative productivity advantage.

Table 4.2 shows the regional shares of manufacturing employment, payroll, and value added in 1963 and 1972. In 1963, the Middle Atlantic region had a higher share of national manufacturing wages than of national manufacturing employment, indicating a higher than average wage. By 1972 this had been reversed, and the region had 20.9 percent of the nation's manufacturing employment but only 19.5 percent of the nation's manufacturing payroll.[15] The decline in value added in this region was not as large as the decline in employment, implying an increase in relative value added per worker. The decline in the labor force has been associated with a rise in relative productivity.

The ratio of value added to payroll for manufacturing by census division is shown in Table 4.3 for 1963 and 1972. Those areas whose shares of manufacturing employment declined between 1963 and 1972—New England, Middle Atlantic, East North Central, and Pacific—also had the lowest ratios of value added to payroll in 1963. Labor was expensive relative to its productivity. The ratios were equal to or below the national average. The two divisions whose share of manufacturing employment had increased most, East South Central and West South Central, exhibited the highest ratios in 1963. The attraction of labor priced low relative to its productivity seems to have been one factor in determining the differential growth rates in manufacturing employment among regions.

Table 4.2

THE REGIONAL SHARES OF MANUFACTURING EMPLOYMENT, WAGES, AND VALUE ADDED, 1963–1972

Region	1963 Shares			1972 Shares		
	Employment	Wages	Value Added	Employment	Wages	Value Added
New England	8.4	7.8	7.1	7.2	6.4	6.4
Middle Atlantic	24.0	24.4	22.6	20.9	19.5	20.0
East North Central	26.4	29.2	29.2	26.1	30.6	28.2
West North Central	6.0	5.9	6.1	6.4	6.3	6.7
South Atlantic	12.5	10.0	11.0	14.4	12.7	12.5
East South Central	5.2	4.1	4.8	6.6	6.1	6.0
West South Central	5.1	4.6	5.7	6.6	6.1	7.0
Mountain	1.7	1.7	1.8	2.0	2.0	3.0
Pacific	10.6	12.1	11.4	10.4	10.6	11.3
Total[a]	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Bureau of the Census, *Census of Manufactures, 1963*, U. S. Department of Commerce, Washington, D. C., 1965; and *Census of Manufactures, 1972*, Washington, D. C., 1974.

[a]Total may not add because of rounding.

[15] The relationship between payroll and employment may be confused by differences among regions with respect to the numbers of low-paid, clerical, nonproduction labor. The data presented in this discussion must therefore be regarded as only a tentative exploration of a subject that merits further research.

Table 4.3

RATIO OF VALUE ADDED TO PAYROLL IN MANUFACTURING BY REGION, 1963–1972

Region	Value Added/Payroll		% Change
	1963	1972	1963-72
New England	1.73	1.89	9.25
Middle Atlantic	1.78	1.90	6.70
East North Central	1.92	1.99	3.65
West North Central	2.00	2.11	5.50
South Atlantic	2.11	2.15	1.90
East South Central	2.23	2.31	3.47
West South Central	2.36	2.40	1.70
Mountain	2.03	2.19	7.88
Pacific	1.82	2.04	12.09
Nation	1.92	2.03	5.73
Variance[a]	0.051	0.038	-25.5

SOURCE: Bureau of the Census, *Census of Manufactures, 1963*, U.S. Department of Commerce, Washington, D. C., 1965; and *Census of Manufactures, 1972*, Washington, D. C., 1974.

[a]The variance, v, of a variable X_i, is defined as

$$v = \sum_i \frac{(X_i - \bar{X})^2}{n - 1}$$

where $\bar{X}$ is the mean value—in this case the value for the nation as a whole—and n is the number of observations, in this case 9. The variance provides a measure of the amount of variation in the value of the variable among observations.

The difference in growth rates may not continue indefinitely. As an area grows rapidly, the pool of low-priced labor gets used up. Conversely, as a region declines, wages fail to grow at the national rate. The relative advantages of the growth areas are slowly eroded, and declining areas become more attractive. This trend is shown in Table 4.3. Between 1963 and 1972, the national ratio of value added to payroll rose by 5.73 percent, from 1.92 to 2.03. Where the share of manufacturing employment fell between 1963 and 1972, the ratio grew faster than in the nation as a whole, indicating that value added was growing faster than payroll and at a rate above the national average. In regions that had experienced a net increase in their share of manufacturing employment during the same time, the ratio grew more slowly than average (with the exception of the small Mountain region). This appears to represent a movement toward an equilibrium distribution of manufacturing employment. The variance of the ratio among regions is becoming less: .051 in 1963 and .038 in 1972. Smith (1975) examined the coefficient of variation among states of received income per worker between 18[illegible]9 and 1960. It had declined throughout the entire period, the decline being most rapid from 1950 to 1960. Although the data are too aggregated to permit any firm conclusions, some tentative hypotheses can

be offered. First, changes in production techniques and the price of some inputs[16] have allowed employers to take advantage of the low-priced labor in the South, South Central, and Southwest. Second, as this expansion of employment has occurred, the ready supply of labor was used up and higher wages had to be offered to attract the labor necessary for continued growth. Through this process, the competitive advantage of growth regions has declined over time, and their growth rate relative to that of the rest of the United States might be expected to decline in the future. Smith (1975, p. 179) used a neoclassical growth model to examine regional growth patterns. He concluded that "immigration is a direct and significant factor which increases employment in high income states. This, in turn, tends to lower the capital-labor ratio, which induces convergence of state income per capita."

The relationship between regional employment shifts and employment productivity illustrates the importance of understanding the factors determining changes in the spatial distribution of economic activity. If the hypothesis is correct, then federal policies affecting regional labor productivity, including manpower and training programs and education, are important.

Labor Skill

Labor productivity is enhanced by the level of education of the workforce, which attracts businesses. The skill or embodied human capital of a labor force can be approximated by education. Sviekauskas (1975) measured the effect of education on productivity. Labor productivity was defined as the value added per man hour and was compared across SMSAs at the two-digit SIC level of aggregation for manufacturing industries. The education variable[17] was significant in six of the 14 industries selected for analysis, including food processing (SIC 20), furniture (SIC 25), printing and publishing (SIC 27), fabricated metal products (SIC 34), nonelectrical machinery (SIC 35), and transportation equipment (SIC 37). The industries whose productivity was most strongly affected by the educational level of the local population were SICs 20 and 27.

Availability of skilled workers is often cited by companies as a reason for choosing a particular location, and it may be as important as the availability of unskilled or semiskilled workers for companies located in the central city. A recent study conducted by Cornell University based on a survey of large companies in New York, found that the availability of skilled labor was, by far, the most important factor in defining an attractive business environment (Weinstein, 1977).

Both Kemper (unpublished) and Stone (1974) find that companies relying on craftsmen and employees who have professional skills are much more likely to select a suburban location than a central city location. There is a tendency for companies to locate near the supply of the type of labor they use most intensely. The rapid growth of many firms in suburban locations follows the movement of skilled workers to the suburbs (Steinnes, 1977).

To assess the extent of the movements of skilled labor to the suburbs, three measures of the education achievement of the population in central cities and

[16] Of particular importance in this regard is the introduction of low-cost industrial air conditioning in the 1950s and the extension of the federal interstate highway system to the South.

[17] Defined as the median years schooling completed by the population of the SMSA over the age of 25.

metropolitan areas as a whole may be derived: the median years of schooling completed by the two populations, the percentage of each population with less than five years of schooling, and the percentage of high school graduates. These data are computed for a sample of 30 large SMSAs. The ratio of the value for the city to the value for the SMSA as a whole was computed for each of these three measures for 1960 and 1970 and is shown in Table 4.4. A value of unity for this ratio shows that both the city and SMSA have identical scores, which implies that the educational attainments of the population in the city and in its suburbs are the same. A value above unity indicates that the city has a higher score than its SMSA as a whole, while a value below unity indicates a lower score for the city. If the 1970 indicator has moved further from unity than the 1960 indicator, then there has been an increase in the disparity between the city and its suburbs.

Table 4.4

CHANGE IN THREE LABOR FORCE QUALITY INDICATORS AND CITY/SMSA RATIO FOR SELECTED CITIES AND SMSAs, 1960–1970

Selected SMSAs	Median Years of Schooling, City/SMSA		% with Less than Five Years of Schooling, City/SMSA		% High School Graduates, City/SMSA	
	1960	1970	1960	1970	1960	1970
Atlanta	0.95	0.95	1.21	1.52	0.91	0.87
Baltimore	0.93	0.88	1.24	1.47	0.84	0.77
Boston	0.92	0.98	1.48	1.55	0.84	0.83
Buffalo	0.91	0.89	1.35	1.49	0.79	0.78
Chicago	0.92	0.93	1.33	1.46	0.84	0.82
Cincinnati	0.95	0.95	1.39	1.47	0.90	0.90
Cleveland	0.86	0.88	1.51	1.72	0.69	0.68
Columbus	0.94	0.99	1.08	1.26	0.90	0.91
Dallas	1.00	1.00	1.02	1.10	1.01	0.99
Dayton	0.91	0.93	1.49	1.62	0.84	0.80
Denver	0.99	0.99	1.30	1.42	0.93	0.91
Detroit	0.93	0.91	1.39	1.56	0.84	0.80
Houston	0.99	1.00	0.91	1.03	1.03	1.01
Indianapolis	0.95	0.99	1.29	1.14	0.90	0.97
Kansas City	0.96	0.99	1.23	1.28	0.95	0.93
Los Angeles	1.00	1.00	1.25	1.24	1.01	1.00
Miami	0.92	0.88	1.12	1.32	0.87	0.83
Milwaukee	0.94	0.97	1.19	1.32	0.89	0.87
New York	0.94	0.95	1.17	1.20	0.90	0.90
Newark	0.81	0.82	1.82	2.16	0.61	0.60
Philadelphia	0.91	0.90	1.35	1.46	0.79	0.78
Phoenix	1.02	1.00	0.74	0.93	1.02	0.98
Pittsburgh	0.93	0.95	1.14	1.23	0.87	0.86
Portland	1.00	0.99	1.15	1.29	1.00	0.96
Rochester	0.01	0.91	1.37	1.57	0.82	0.77
St. Louis	0.91	0.82	1.35	1.70	0.75	0.69
San Diego	1.01	1.01	1.03	1.06	1.01	1.01
San Francisco	0.98	0.99	1.34	1.54	0.94	0.94
Seattle	1.00	1.00	1.17	1.39	0.99	0.96

SOURCE: Bureau of the Census, *The Statistical Abstract of the United States, 1973*, U. S. Department of Commerce, Washington, D. C., 1974.

In terms of median years of schooling completed, central cities tended to narrow the disparity with the SMSA between 1960 and 1970. The ratio either grew or remained constant in all but seven of the 30 metropolitan areas.[18] In these SMSAs,

[18] Baltimore, Buffalo, Detroit, Miami, Philadelphia, Phoenix, and Portland.

the central city fell behind the suburbs in upgrading the median educational attainment.

The relative concentration of population with low educational attainment—less than five years of schooling—in the central city has increased (the ratio has risen) for all the listed cities except Indianapolis and Los Angeles.

The ratio of the percent of population that have graduated from high school in the central city to the corresponding percent in the SMSA as a whole was below unity in 1960 for all but six cities, indicating a general trend for suburban areas to attract a disproportionately large share of the population at this level of education. By 1970, only three cities still had ratios above unity. In most cities this ratio declined between 1960 and 1970, indicating a faster growth in this fraction in suburban areas than in the central cities. Clearly, the more educated members of the workforce have moved toward the suburbs.

To an inmigrating company, job training programs may be an important source of the appropriate labor skill supply. Even if the skill level of a labor force in an area is low, state or federally subsidized training programs may still be adequate incentives for firms to locate there. The Fantus Company (1966) found that such programs in Appalachia were regarded as a positive inducement by inmigrating firms. However, when asked what could be done to improve the business climate in Chicago, only ten out of 117 firms suggested instituting local job training programs (Hartnett, 1972; and Tables 4.8 and 4.9 below). The EDA survey (Table 3.4 above) found that only a few companies ranked vocational educational facilities as important, and even fewer ranked higher educational facilities important in determining location.

Wages

The wage at which labor of a given skill can be hired is obviously a powerful factor to a company, given the share of the wage bill in total business costs. The role of low-cost labor in the rapid development of the South has already been cited. Fuchs (1962) used state wage levels as an explanatory variable in his analysis of regional growth and estimated that one-third of the adjusted interregional shifts in employment were attributable to low wages; 8 percent of all industries placed a primary emphasis on labor. However, changes in the comparative advantage of a region with respect to the wage rate can occur rapidly. The use of wages in a regression analysis, with no measure of productivity, does not provide an accurate measure of the cost of labor.

It has traditionally been argued that wage differentials within a metropolitan area tend to be slight and therefore to play a very small role in intra-area location decisions. In a detailed study of the labor market in Chicago, Rees and Schultz (1970, p. 11) concluded that the metropolitan area is, in fact, composed of "a number of different kinds of submarkets, marked by wage differentials related to patterns of residential and nonresidential areas, concentrations of particular kinds of industry, and concentrations of non-white populations."

Wages may play an important role in intercity growth differences. They are not determined exogenously. Many factors play a role. The willingness of labor to work in any given area is obviously important. An extreme example is the high wages paid to all types of labor in Alaska to compensate the workers for the harsh conditions and social dislocation suffered in working on the trans-Alaskan pipeline

as well as for the high prices of goods and services in Alaska. There are less extreme examples. Izraeli (1973) performed a cross-sectional comparison among SMSAs and found that wages are higher in cities with high local taxes, high costs of living, and low levels of amenities. The labor market appears to equalize real income of different skill levels between alternative locations, perhaps even within the city.[19] For example, Hoch (1972) found that money income was positively related to city size, a relationship that was attributable in part to higher commuting costs in large cities. Goldfarb and Yezer (1976) examined intercity variations in wage rates for selected occupations. They found that wages increased with city size, most rapidly in smaller cities. Although variations in white collar wages were explained in large part by cost of living differences, the far larger variations in blue collar wages could not be explained by cost of living differences. Neither race nor federal wage policies added any explanatory power to the analysis. The differences may arise because blue collar workers are less mobile than white collar workers and therefore interarea wage differentials are not reduced rapidly by migration.

The wage level in any one sector is affected by wage levels in other sectors. If labor in one sector in a region, either through union activity or unique local advantages, has a high wage level, then competition between sectors may drive up wages in other sectors. For example, the high wages obtained in the automobile industry in Detroit have probably resulted in that city's also having one of the highest wage levels in the nation in nonmanufacturing business. Hanna (1959) studied income differentials across states and found that in states with a high level of employment in high-wage industries, incomes in typically low-income industries tended to be above the national average.

Overall, there is too little evidence relating wages to metropolitan growth to estimate the effect these wage differentials may have on the course of development.

Unionization

Companies have cited high rates of unionization as reasons for leaving the Northeast (Beckman, 1974). There is little evidence to suggest that, other than through its influence on wages, unionization is a factor in location decisions (Wheat, 1973; Fuchs, 1962). The fraction of the labor force that is unionized appears to respond to the rate of growth of an area, rather than vice versa. High-growth areas have experienced an increase in unionization, while declining areas have lost union membership, partly perhaps because of the outmigration of highly unionized industries from declining areas.

Between 1964 and 1970, the percentage of the national nonagricultural labor force that was unionized fell from 29.5 to 27.9 percent. Table 4.5 lists the percentage of nonagricultural workers who were union members in selected states in 1970 and the change in this percentage between 1964 and 1970. In New York, New Jersey, and Pennsylvania, representing the Middle Atlantic division, the rate of unionization declined 2.9, 2.8, and 1.5 percentage points, respectively. Georgia, Virginia, and North and South Carolina, situated in the growing South Atlantic division, all experienced an increase in the percentage of their work forces unionized, as did

[19] However, *within* a metropolitan area, real income is equalized to some extent through changes in land values. Land prices tend to reflect the desirability of a neighborhood, and residents in an unattractive location are compensated by lower property prices.

Table 4.5

LEVELS AND RATES OF CHANGE OF LABOR FORCE UNIONIZATION BY SELECTED STATES, 1964–1970

State	% Nonagricultural Labor Force Unionized, 1970	Change in %, 1964-1970
Nation	27.9	-1.6
New York	35.6	-2.9
New Jersey	29.5	-2.8
Pennsylvania	37.2	-1.5
Georgia	16.2	+2.2
South Carolina	9.6	+2.2
North Carolina	7.8	+0.4
Virginia	16.7	+1.1
Tennessee	20.6	+1.4
Texas	14.4	+0.3
California	30.5	-2.8

SOURCE: Bureau of the Census, *Statistical Abstract of the United States 1973*, U. S. Department of Commerce, Washington, D. C., 1974, p. 250.

Tennessee (East South Central) and Texas (West South Central). California experienced a decline, which is consistent with the decline in the share of national manufacturing employment experienced by the Western division.

The older manufacturing areas still exhibit the highest levels of union membership, but this is not necessarily associated with high incidences of labor disputes that might encourage companies to move out. Days lost through work stoppages have been at or below the national average in the New York area.[20] For example, in 1971, 37 out of every 10,000 working hours were lost in labor disputes nationally, but in New York and northeastern New Jersey only 23 out of 10,000 working hours were lost.

There is some evidence that unionization is associated with increases in wages. Hall (1971) found that union membership was associated with a considerable increase in wages, even controlling for occupation and industry. His results are shown in Table 4.6. He divided the sample of workers into four subgroups, by race and sex. The largest differentials attributable to union membership were found for white males and, in general, for rural rather than urban areas. Black females experienced a significant gain from unionization only in the South, while black males gained only in urban areas except in the South where they gained in both rural and urban. For all groups, location in the Northeast and North Central regions did reduce the advantages of union membership. The apparent greater advantages of union membership in rural areas for whites may be attributable to the low overall rate of unionization in those areas.

[20] *Regional Report No. 25*, U.S. Department of Labor, Bureau of Labor Statistics, Middle Atlantic Region, 1972.

Table 4.6

WAGE DIFFERENTIALS ASSOCIATED WITH UNION MEMBERSHIP BY COLOR, SEX, AND REGION, 1967

Region		Percentage Difference			
		White Males	Black Males	White Females	Black Females
Northeast	Urban	12	11	9	0
	Rural	22[a]	---	18[a]	-28[a]
North Central	Urban	16	24	20	4[a]
	Rural	30	---	21	---
South	Urban	24	34	24	22
	Rural	31	33	23	49
West	Urban	17	22	18	6[a]
	Rural	29	---	2[a]	---

SOURCE: Adapted from Table 4 in Robert E. Hall, "Prospects for Shifting the Phillips Curve Through Manpower Policy," *Brookings Papers on Economic Activity*, No. 3, 1971, p. 686.

[a]Not significant at the 95 percent confidence level.
---Not estimated because of small sample size.

Minority Hiring

There is little evidence concerning the effect that minority hiring may have had upon location decisions. Stone (1974, p. 71), in a study of firms relocating in Boston, found that "the percentage of minorities [in the work force] was about the same for firms leaving as for staying." There was some indication that the income of minorities moving to the outer-suburban ring was above average. Outmigration of employment, at least in Boston, appears to involve as much minority participation and possibly more higher-wage minority participation than is involved in firms remaining in the city. If firms were moving to avoid hiring minorities, these types of results would be unexpected. However, the influence of the large concentrations of minorities on growth and location decisions of companies needs more research.

LAND

Although a shortage of low-priced land in central cities has often been advanced as a reason for the decline in manufacturing activity in those areas, there is little evidence to substantiate this view. Measuring the availability of land in an urban area is a difficult task since land embodies many locational factors that may or may not be important to a company, depending upon its factor requirements. Square footage is not the only consideration in the purchase or lease of land. The purchaser is interested in the availability of transportation linkages, the ease with which trucks can make deliveries and collections, and the proximity of a railroad spur or a shipping pier; he is also concerned with the safety of the neighborhood, what

precautions will have to be taken to minimize losses due to theft and vandalism, and the security necessary to protect his work force. The level of municipal services is also a factor—the reliability of waste disposal, roads, and police patrols. The activities of neighboring companies may also affect the value of a location. They might contribute economies of agglomeration—shared security, personnel, business services, or a rail spur—or they might lower the attractiveness of the area through air pollution or road congestion. To the price per square foot must be added property taxes, including any incentive reductions, and the availability and costs of mortgage loans.

In its study of firms relocating in suburban areas in New York, the Beckman Commission (1974) found that outmigration was accompanied by massive increases in floor area. Firms moving to Nassau and Suffolk counties between 1961 and 1973 had occupied 7763 million square feet in New York City but 13,176 million square feet at their new sites. This 70 percent expansion in area was accompanied by only a 4.5 percent increase in employment. Firms moving to Westchester and Rockland counties expanded their floor space from 1297 to 3354 million square feet while their employment fell from 8150 to 7860. However, the increase in land use per employee does not necessarily imply that lack of land was the reason for moving; it may simply reflect the optimum mix of factors in the new location where land is much cheaper. That is, the decision to move may have had various causes, but once the decision was made, the companies adopted techniques of production reflecting lower land prices at their new location. Harris and Hopkins (1972) found few industries whose growth was affected by land prices. These tended to be service rather than manufacturing industries.

It is doubtful whether the availability of land is a barrier to development. There is a great deal of vacant land and space within the nation's largest cities. However, local institutional restrictions on the use of land, including zoning ordinances, problems of acquiring planning permission, and assembling lots of sufficient size may pose barriers to companies wishing to expand or set up operation in a city.[21] The frequency with which local bureaucratic red tape and regulations were mentioned as a problem associated with central city locations attests to their potential influence.[22]

Hamer (1973) studied land prices for different types of industries in Boston and concluded that little could be done to reduce the comparative advantage of suburban locations with regard to low-cost, accessible land. In many instances, manufacturing businesses have been bought out of their central city location by office and residential building developers. The City Planning Commission in New York City estimates that 40 percent of the loft space in lower Manhattan, originally used by the apparel industry, is now used for residential or commercial purposes. Elsewhere, old manufacturing sites are redeveloped as civic centers providing cultural and recreational facilities. However, in some cities, industrial parks, which can be occupied at a fairly low cost by manufacturing firms, lie idle. In this case, price of central city land is not the major problem. There are no reliable data on interregional and intraregional land prices and quality that would permit identification of industries and regions where land prices are a problem for manufacturing develop-

[21] Members of the New York State Job Development Authority expressed this view to me in an informal discussion. The problem is also addressed in Hamer (1973) and No'l (1970, p. 502 ff).

[22] See the discussion of the importance of the local public sector below.

ment. High prices indicate that land has a number of alternative uses that would generate employment. Commercial development of land, particularly office buildings, tends to generate more jobs per acre than manufacturing development. The high price of urban land is unlikely to pose a development problem.

RAW MATERIALS

Proximity to raw materials, once a major determinant of the location of several manufacturing sectors,[23] has declined in importance. As Niedercorn and Kain (1963, p. 130) explain:

> This is an inevitable concomitant to the later stages of economic development because value added by labor and capital becomes a larger and larger proportion of the total value of output. Today's complex products require much more processing per unit of raw material than those of a generation ago. So, location near the source of raw materials no longer gives an area a decisive advantage in many branches of manufacturing, because raw material costs have become a smaller fraction of total costs.

A similar conclusion was reached by Chinitz and Vernon (1960). This has led to a decline in employment in the old manufacturing belt, whose preeminence was based upon its extensive deposits of coal and iron ore.

Lichtenberg (1960) estimated that the location of 8 percent of manufacturing employment was determined by closeness to raw materials. Wheat (1973) estimated that between 1 and 8 percent of the differences in absolute employment growth among states could be explained by differences in the availability of raw materials (15 percent of the differences in per capita growth could be explained this way). He cited, in particular, refining in the Southwest, lumber in the Southeast and Northeast, and pulp and paper in the South and West.

Fuchs (1962) estimated that one-third of the employment shifts between regions from 1929 to 1954 were due to differences in resource endowments. However, he included climate as a resource. Although, as Fuchs argues, climate can be regarded as a resource for the aircraft industry, the climate variable may capture the effects of population movements (market), and be correlated with cheap and plentiful supplies of labor.[24]

Raw materials may affect location decisions within urban areas in a different way. Handling raw materials encourages firms that use them extensively to seek a suburban rather than a central city location so as to minimize the costs of constructing land intensive truck-loading facilities and warehousing. Although the effect is weak, this tendency is perceptible in Kemper's results (see Table 3.1).

ENERGY

Recent international developments and the response of the federal government have made the energy sector and the effects of federal energy policies areas of

[23] For example, the steel mills at Gary are strategically located between the iron ore sources in northern Michigan and the coal of Pennsylvania.

[24] Fuchs did include the longitude of the principal city in the state as an exogenous variable in his cross-state analysis. However, the potential correlations between these independent variables does not rule out the hypotheses offered above.

considerable importance. In 1974, manufacturing used one-third of all energy consumed in the United States, 24.1 quadrillions of Btus. The residential and commercial sectors accounted for 24 percent, and transportation a further 25 percent (*U.S. Statistical Abstract*, 1975, p. 531). If that part of transportation consumption used for the transportation of goods and services is included, then manufacturing consumes nearly one-half of all the energy used in the United States.

The rapid increase in energy prices since 1971—as can be seen in Fig. 4.2—is likely to have had and to continue to have considerable impact upon industrial development. For 25 years following World War II, the real cost of energy declined, encouraging the adoption of energy-intensive techniques. During the early 1970s this trend was abruptly reversed. Between 1962 and 1974, value added in manufacturing rose from $192 billion to $381 billion, an increase of 100 percent. During the same time period, expenditure on energy rose from $6.2 billion—3.2 percent of value added—to $19.5 billion—5.1 percent of value added, an increase of more than 200 percent. Industries will substitute among alternative energy sources—not all have increased in cost at the same rate—they will attempt to conserve energy, and they will substitute other factors of production for energy by altering their location, prices, and level of output.

Little is known about the influence of energy prices in determining the rate of growth of industry. There are a few "energy dependent" industries whose location is determined by the availability of low cost fuel. The most obvious is aluminum smelting, whose high demand for electricity has resulted in the concentration of the industry in the Pacific Northwest, close to cheap hydroelectric power.[25] For most industries, however, expenditures on energy are less than 1 percent of the value of shipments. Table 4.7 shows the percentage of the value of shipments that is spent on energy (electricity, natural gas, oil, and other fuels) by industry (identified at the two-digit SIC level).

Attempts to relate the level of employment or the rate of growth of employment in an industry to the cost of fuel and electricity have met with little success. Harris and Hopkins (1972, p. 93) found that employment for many industries was positively related to energy costs. This, they concluded, was a result of "two offsetting tendencies—lower fuel or power costs would be an incentive for greater employment, but on the other hand, greater employment in an area would tend to drive up fuel costs." Energy costs rarely achieve top priority in any of the surveys of industrial location. Huntington and Kahn (1976) examined the relationship between growth rates in employment in 13 two-digit manufacturing industries across states and related the two variations in energy prices by states. They found that energy prices performed better than industrial concentration, per capita income, or climate as an explanation of regional growth. It was significant for eight of the industries they examined. The most responsive industries were chemicals, petroleum products, food products, and transportation equipment. However, when they included population, a dimension of market demand, as an explanatory variable, the significance of energy prices was reduced. In view of the small number of explanatory variables and the simple regression model used, little weight can be attached to their findings.

[25] There is a wide range in the cost of electricity to industrial and commercial concerns. See, for example, U.S. Bureau of the Census, *Census of Manufactures, Special Report S.6, 1972*, U.S. Department of Commerce, Washington, D.C., 1975.

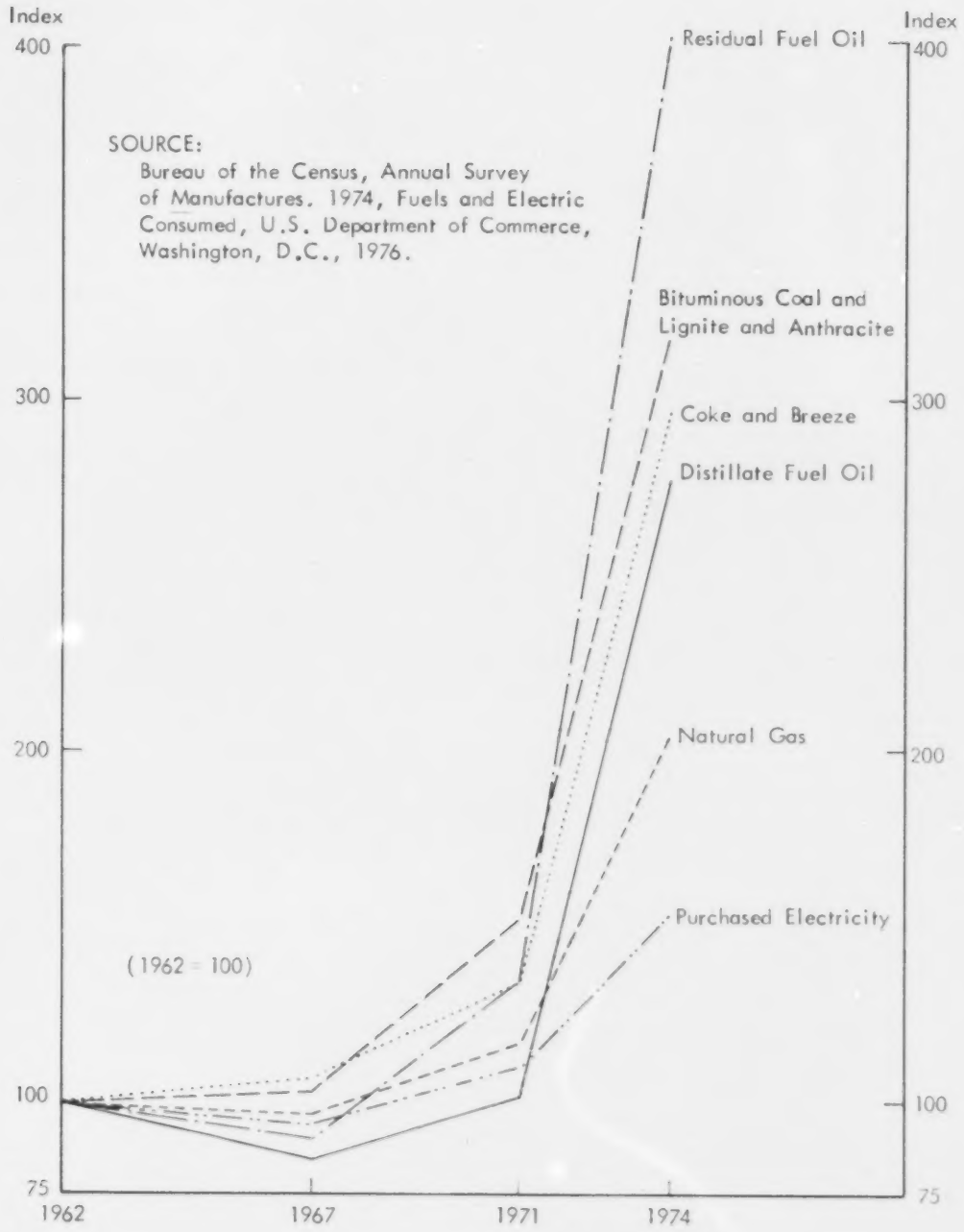


Fig. 4.2—Cost per unit of selected fuels and purchased electricity consumed by all manufacturing industries: 1974, 1971, 1967, and 1962

Table 4.7

ENERGY EXPENDITURE AS A PERCENT OF VALUE OF SHIPMENTS BY TWO-DIGIT MANUFACTURING SIC, 1971

Industry		Percent
SIC	Description	
20	Food Processing	0.44
22	Textiles	0.66
23	Apparel	0.13
24	Lumber and Wood Products	0.66
25	Furniture and Fixtures	0.30
26	Paper and Allied Products	0.22
27	Printing and Publishing	0.17
28	Chemicals	1.72
29	Petroleum and Coal Products	1.66
30	Rubber and Plastics	0.42
31	Leather	0.31
32	Stone, Clay and Glass	3.08
33	Primary Metal	1.97
34	Fabricated Metal	0.34
35	Nonelectrical Machinery	0.31
36	Electrical Machinery	0.21
37	Transportation Equipment	0.18
38	Instruments	0.22
39	Miscellaneous	0.20
	All Manufacturing	0.79

SOURCE: Bureau of the Census, *Census of Manufactures, 1972*, U. S. Department of Commerce, Washington, D. C., 1974.

Further research to identify the effects of energy prices on industrial growth must be based upon a disaggregation below the two-digit SIC level.[26] If a more disaggregated approach is used, a negative relationship may be discernible. Figure 4.3 shows, for a group of three-digit and four-digit SIC industries, the relationship between an industry's relative success in New York[27] and its energy intensity. New York is one of the most expensive places to purchase energy, and, therefore, a negative relationship would be expected. The dotted line represents the relationship expressed by the plots and does show a strong negative relationship. As the energy intensity increases, relative success in New York declines. Obviously, more detailed research of this type is needed if one is to evaluate results of the recent increases in energy prices and proposed federal energy programs.

Another problem with identifying the importance of energy is that, as well as its cost, the quality of supply—freedom from interruption, 24-hour availability, or low fluctuation in voltage—is important to some industries.

[26] Studies based upon the national input-output tables include several industries that are clusters of three-digit SIC industries.

[27] Measured as the difference between national employment growth and growth in employment in the New York SMSA between 1968 and 1973.

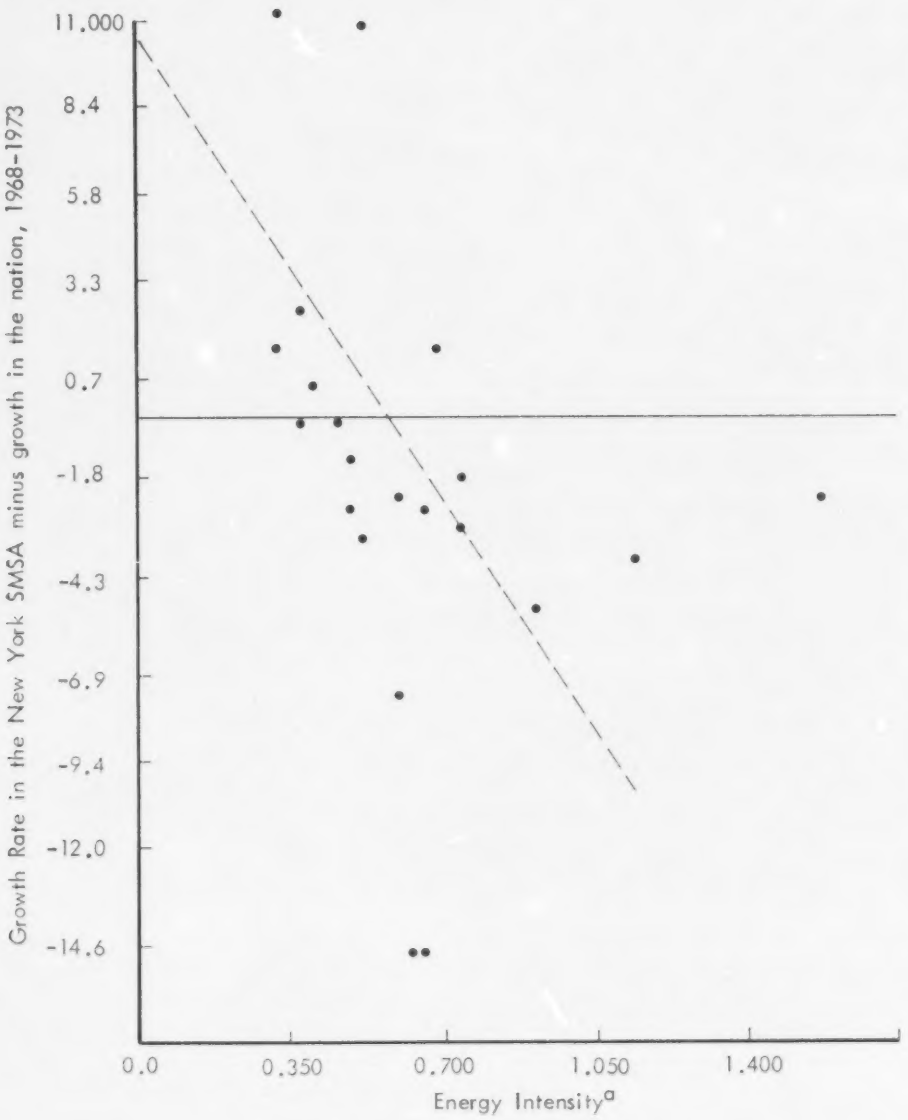


Fig. 4.3—Energy intensity and relative success of industries in New York City

[a] Defined as expenditure on energy as a percent of the value of shipments.

Estimates of the price elasticity of a factor (the change in the quantity consumed in response to a change in price) and the cross elasticities (change in the quantity consumed of one factor in response to a change in the price of another factor) are both useful in the case of energy, where federal policies may substantially alter its relative price. From an analysis of factor shares of total output in the United States, Berndt and Wood (1975) concluded that: (1) Energy demand is responsive to a change in its own price—a price elasticity of −0.47; (2) energy and labor are slightly substitutable; (3) energy and capital are substantial complements; and (4) capital and labor are quite substitutable. They conclude that an increase in energy prices will lead to a reduced capital intensity and that investment tax credits will lead to increased energy intensity.

FINANCE

The availability and cost of finance are important factors in economic development. There has been very little research into the effects that differences in regional capital markets may have on different growth rates. It is usually assumed that the capital market is a national market and that all borrowers face similar interest rates and loan availability. However, the banking industry is heavily regulated at both the state and federal level (Gardner, 1973). This regulation may have influenced interest rate differentials, which, in turn, influenced local growth rates.

The interest rate measures one aspect of the cost of business loans. Large businesses are able to borrow in the national money markets. However, the local rate reflects the local cost of credit and is important to small business since a significant portion of borrowing is done locally (Straszheim, 1969). The local bank's loan officer is in a position to uncover detailed information—both formally and informally—during the evaluation of a business loan application. It would be difficult for a more distant bank to collect the same information as cheaply. Most small businesses must therefore rely on local banks, and so the local interest rate is probably an important factor. The share of bank loans in nonfarm business finance is small; for noncorporate small businesses, however, it is large. In view of the importance of the central city's role as an incubator for new businesses and of the small size of many central city businesses, variations in bank behavior among cities may be important. Straszheim identified a significant regional variation in loan rates, with a larger spread in small-loan rates than in large-loan rates. He also found that, over time, these variations are narrowed during periods of tight credit.

Other aspects of bank credit deserve attention. The interest rate alone does not reflect the availability of credit. Entry into the banking field is quite severely restricted. Peltzman (1965) estimated that there were 50 percent fewer new banks than there would have been in the absence of regulation. Pakonen (1971) found that the entry rates were reduced even further in unit-banking states.[28] Restricted entry allows banks to discriminate among loan applications to minimize risk. Gardner (1973) found that banks in St. Louis behave much more conservatively than they would in the presence of more competition. Clearly, this risk-averse behavior may dampen growth by causing new companies to shift to more congenial areas.

[28] In Illinois and Missouri, for example, branch banking is not allowed. This prevents banks from enjoying any economies of scale that might result from the operation of more than one branch.

TAXES AND MUNICIPAL SERVICES

The burden of taxes is often advanced as one of the reasons why both people and companies move away from central cities. High taxes in New York State were cited as a reason for leaving the area by 54 out of 109 relocating companies interviewed (LCER, 1974). However, no empirical analysis has been able to find a significant relationship between local taxes and economic development. Because of the complexity of the tax structure and the considerable variations among cities, the analysis of the role of the local public sector is a difficult task. Taxes at a particular location are offset to some degree by the level of municipal services that the company enjoys. High taxes accompanied by a high level of services—fire and police protection, garbage disposal, and roads, for example—may be preferred to lower taxes accompanied by a much lower level of services. An additional problem is that many cities and states have offered certain companies tax breaks to encourage their inmigration (Beckman, 1974).

State and local governments have shown a considerable interest in tailoring the tax price at which they offer their services to manufacturing firms. There is considerable evidence that manufacturing concerns generate a fiscal surplus; that is, they tend to pay more in taxes than it costs the municipality to provide the services demanded (Gerweck and Epp, 1974; Groves and Riew, 1963; Kee, 1968; and Leowenstein, 1963). Attracting new industries is therefore of considerable concern to local governments.

Taxes

Individuals and businesses pay a variety of direct and indirect taxes. Of primary importance, although most difficult to relate to location decisions, are personal and corporate income taxes;[29] next in importance is the local property tax, levied annually on the value of land and, usually, buildings and, rarely, on other capital assets; third is the local sales tax, which affects the revenue a company receives from marketing its output and also, in some cases, the price that it must pay for supplies and equipment; last is the menu of additional taxes that cities have imposed, including payroll taxes, license fees, and commercial occupancy taxes.

There have been several attempts to make empirical estimations of the importance of taxes. Thompson and Mattila (1959) found no significant relationships between state and local taxes (as a percentage of personal income) and the absolute or percentage growth in all industries or for any single industry. Schmenner (unpublished), using data on relocating industries, was also unable to uncover any significant effect of taxes on location.

The Advisory Commission on Intergovernmental Relations (1963) also attempted to uncover a relationship between state and local tax rates and the manufacturing growth rate but concluded that federal tax neutralization policies leave very small tax differentials between neighboring states. In a more detailed study, Williams (1961) compared production costs for average establishments in two-digit and four-digit SIC industries before and after taxes. He found that state and local taxes contributed only 3 or 4 percent of value added costs and had very little effect

[29] Personal income taxes are important both for the individuals who must pay them and for wage costs, since taxes will be partly capitalized through employee wage demands.

on the cost rankings of industrial states for specific industries. Levin (1974) attempted to relate the size of urban-suburban property tax differentials to patterns of industrial location in urban areas in Michigan but found no effect.

No relationship was found in a detailed study of economic development in a large number of small municipalities in Missouri. Further, tax breaks and exemptions were typically attempted in areas with an older, more established entrepreneurial and civic leadership group. CONSAD (1969, p. 1.12) concluded that:

> Tax exemptions and subsidies, traditionally associated with local economic development programs, were found to be given greater emphasis in the least urbanized areas having the least "new blood." They were not correlated with economic development success.

In an examination of housing and employment in Milwaukee, Orr (1975) found some tentative evidence in the manufacturing and wholesale sectors that differences in tax rates did affect the distribution of employment opportunities within the metropolitan area. It is difficult to measure this relationship with any confidence, since changes in tax rates and in the level of municipal services will be reflected in land prices. In areas where municipal tax rates are high relative to the quality and quantity of public services, land prices will be driven down, compensating the firm for the low level of services and reducing the tax burden.

The failure of any study to uncover a significant relationship between taxes and plant location should not be taken as conclusive evidence that local taxes are not relevant to the development process. If the location decision is a two-stage process (Sec. III), then the methods used in these analyses are inappropriate. States or regions are too large to reflect the influence of local tax rates. In addition, many of the studies have analyzed total employment rather than the distribution of marginal (relocating) plants among local jurisdictions. For example, "reasonable taxes" ranked third in the factors examined by the McGraw-Hill survey (Table 3.3). Schmenner (unpublished) concludes that, based upon present evidence, cities and towns need neither fear that high tax rates alone will drive out businesses nor rejoice that low tax rates will guarantee rapid economic development. Tax credits, tax forgiveness, and subsidized loans offered by many state and local governments as incentives to attract businesses may have little effect. Weinstein (1977, p. 75) concludes:

> Taken as a whole, these incentives probably represent a serious misallocation of resources. In the main, government is subsidizing firms for performing activities they would have undertaken in any case. Furthermore, when one considers that any incentive designed to reduce a company's state or local tax bill will increase that firm's federal tax liability—due to the deductibility of state and local taxes in computing federal net taxable income—the superfluity of tax incentives becomes even more apparent. The result is a form of reverse revenue sharing in the amount of 48 cents on the dollar.

Municipal Services

The role of public services in industrial location is even more difficult to assess than the role of taxes. The effectiveness of municipal services can influence the crime rate, the level of amenities, the overall atmosphere within which business is conducted, the quality of neighborhood schools, and the quality of the air. The only insight into the role of the quality of municipal services has come from question-

naires and surveys. The Economic Development Administration (1971) survey found that fire and police protection were the two factors among community attributes most frequently cited as being of prime importance (Table 3.4). In the survey conducted by Hartnett (1972), reported in Tables 4.8 and 4.9, services were ranked 13th (out of 23) among *vitally important* (Table 4.8) and tenth among *important* factors (Table 4.9). However, several public service-related factors were also listed, including the "condition of the neighborhood" and "zoning."

An interesting insight into another aspect of municipal services and the role of local government also emerges from Hartnett's survey. The last question asked firms what they felt the city could do to improve the business climate. There were 117 responses. The city should: train labor (10), offer financial incentives (9), purchase its supplies from industries located in the city (3), reduce taxes (31), reduce the number of rules and regulations (8), cut red tape (10), end harassment by city inspectors (21), reduce time lost from inspection visits (6), and improve its attitude (11). The fact that regulations, red tape, harassment, inspection time, and attitude accounted for 56 of the responses, compared with 40 percent for taxes and financial incentives, shows the potential importance of these aspects of municipal behavior that have received little attention.

Table 4.8

RANKING AND NUMBER OF VITALLY IMPORTANT RESPONSES FOR EACH LOCATIONAL FACTOR

Factor	Ranking	Number of Responses
Public transportation	1	112
Unskilled labor	2	89
Female production workers	3	79
Room for subsequent expansion	4	65
Market in city of Chicago	5	58
Semi-skilled labor	6	47
Skilled labor	6	47
Rail siding	8	42
Expressway	9	40
Traffic access	10	30
Suppliers in city of Chicago	11	24
Cost or rent of facilities	12	19
Municipal services	13	17
Market in rest of Chicago SMSA	14	16
Condition of neighborhood	15	15
Zoning	16	14
Market elsewhere	16	14
Non-production workers	18	9
Parking	19	8
Taxes	20	4
Suppliers in rest of Chicago SMSA	20	4
Suppliers elsewhere	20	4
Industrial climate	23	2
Prestige of location	23	2

SOURCE: Harry D. Hartnett, "Industrial Climate in Central Cities," *American Industrial Development Conference Journal*, Vol. 7, No. 2, April 1972, p. 25. Reprinted by permission of the author and the *American Industrial Development Conference Journal*.

Table 4.9

RANKING AND NUMBER OF IMPORTANT RESPONSES FOR EACH LOCATIONAL FACTOR

Factor	Ranking	Number of Responses
Traffic access	1	90
Condition of neighborhood	2	84
Cost or rent of facilities	3	72
Room for subsequent expansion	4	63
Expressway	4	63
Market elsewhere	6	53
Public transportation	7	50
Suppliers in city of Chicago	8	48
Semi-skilled labor	9	47
Municipal services	10	44
Parking	11	42
Market in rest of Chicago SMSA	12	39
Industrial climate	13	35
Market in city of Chicago	14	34
Skilled labor	15	29
Rail siding	16	22
Zoning	17	21
Suppliers in rest of Chicago SMSA	17	21
Unskilled labor	19	20
Non-production workers	20	19
Taxes	21	18
Female production workers	22	17
Suppliers elsewhere	23	8
Prestige of location	24	6

SOURCE: Harry D. Hartnett, "Industrial Climate in Central Cities," *American Industrial Development Conference Journal*, Vol. 7 No. 2, April 1972, p. 26. Reprinted by permission of the author and the *American Industrial Development Conference Journal*.

EXTERNAL ECONOMIES

Urban researchers have long hypothesized that companies may receive certain advantages by locating in a large urban area, advantages that result from processes external to the individual company but that can reduce the cost or improve the productivity of labor when the company does business there. Urban areas, with their diverse economic bases and large labor forces, may offer advantages to some industries that cannot be found in suburban or nonmetropolitan areas. By identifying those industries or even types of firms that seem to be especially attracted by agglomeration economies, federal and local urban development policies could be tailored to them and be used more effectively. Further, substantial agglomeration economies imply that the process of decline in employment in some urban areas will be self-sustaining. If firms move out of the city or substantially reduce their level of employment, then the economies of agglomeration, and therefore the competitive position of remaining companies, will be impaired.

There is some evidence that several industries experience advantages from agglomeration. This may apply to metropolitan areas as a whole. Sveikauskas (1975) found that a doubling of city size was associated with 6 percent increase in labor productivity.[30] In a more detailed analysis of 73 SMSAs also using value added per capita as the dependent variable, Segal (1976) found that although there were constant returns to scale across the entire sample, large cities enjoyed economies of agglomeration. He included a large number of independent variables[31] and found that the influence of size was positive if the sample were grouped into two categories and SMSAs with population in excess of two million were treated separately. He concluded (p. 347) that

> Constant returns to scale obtained across cities of different size, and an "agglomeration effect," imbedded in the constant term of the production function for the largest cities, makes units of labor and capital 8 percent more productive in these cities. The presumed reason for this is that there are pronounced net benefits of agglomeration in production in large metropolitan areas—areas with over 2 million population in 1967.

The behavior of industries that are geographically concentrated provides some insight into the possibility of industrial economies of scale that are external to the individual company. An industry is concentrated in an area if its share of employment in that area is above its average share of total employment in the nation. Industries tend to concentrate within certain zones in SMSAs. The grouping of apparel companies in the West side of lower Manhattan is an obvious example. Struyk (1972) found such concentrations in all major industries in four metropolitan areas.[32] Struyk and James (1975) found that concentrated industries responded differently to economic factors than nonconcentrated industries. Firms in areas of industry concentration grew or declined more slowly than firms in the same industry located elsewhere. Overall, however, concentrated industries seemed to perform less well than nonconcentrated industries in central cities. Kemper (unpublished) found that firms in concentrated industries were much more likely to locate in central cities, particularly in the central business district, than in suburban areas.

Struyk and James (1975) felt that central cities should exploit their comparative advantage by providing aid to their enclaves of concentrated industries. Once a decline started, they argued, it would feed on itself. Further, given the stability of concentrated firms, industrial location studies should focus upon nonconcentrated industries, since these were much more volatile in their response to changes in transportation, markets, and other factors. The failure of most location studies to distinguish between the behavior of firms in areas of concentration and nonconcentration may have led to considerable bias in the results.

The argument that economies of scale favor large cities has also been applied to municipal services (Mera, 1973).[33] If economies of scale exist, then the cost of providing a given level of services would be less in large cities than in small. This is important in determining the perceived burden of local taxes on industry. But

[30] Measured as value added per worker in manufacturing.

[31] Including the capital stock, attributes of the labor force, the industrial structure, and the regional location of the city.

[32] The industries were identified at the two-digit SIC level of disaggregation and constituted at least 5 percent of the manufacturing labor force.

[33] See also the response of Borukhov (1975) and Mera (1975).

it is difficult to determine whether an increase in per capita expenditure on services (which seems positively related to city size) represents an increase in the quality of services provided or an increase in costs associated with size (diseconomies of scale). The evidence in favor of the existence of economies of scale is inconclusive (Harrison, 1974) with the possible exception of sewage and waste treatment facilities. In that service category, per capita costs may in fact decline as city size increases.

The diversity of the urban economy offers certain advantages to companies that rely upon face-to-face interaction with either competitors or suppliers of specialized inputs or services. Although improvements in communication have obviated the need for some types of personal interaction, formal and informal contacts with bankers, designers, scientists, and others may be important to some businesses. This aspect of the interservice advantages of a central city location is well expressed by a New York toy manufacturer (quoted in the *New York Times*, February 28, 1975, p. 53): "If I take my staff out of town we miss a new idea by 90 days." The types of interactions allowed in the diverse business center of a large city may provide the necessary inputs for the development of new companies.

Stone (1974) found that heavy users of specialized business services tended to locate in the center of Boston rather than in suburban areas. Kemper (unpublished) found that firms relying on specialized inputs were more likely to locate in New York City's CBD than in less central locations.

Even during periods of national and regional decline, the central city remains a powerful incubator for new companies. The ready supply of labor of a variety of skills, inexpensive small sites (particularly loft space), the presence of a multitude of business services, and the availability of transportation linkages and public services make the city, and particularly the CBD, an attractive location for embryo companies. However, Struyk and James (1975) found that the incubator effect for new manufacturing jobs operated only in some areas in some cities. For example, the ratio of the share of employment in new establishments to the share of base year employment in the central industrial district, a measure of the concentration of new jobs in that area, exceeded unity only in Cleveland and New York City, and was well below unity in Boston, Minneapolis, St. Paul, and Phoenix (Leone and Struyk, 1976). The "incubator function" is therefore not general to all cities. Leone (unpublished) found that, in New York City, this function may be insensitive to cyclical fluctuations. In 1969-71, New York City gained 19,665 jobs through the birth of new companies, in spite of the economic recession. This was only about 3,000 less than the number gained during 1967-69, a period of economic expansion. Pred (1966) argued that innovation and invention are positively related to both city population size and city population growth rate. He examined patents per capita in different locales, and concluded (p. 129) that "the larger the city . . . the larger the volume of short-distance information flows, and the greater the awareness of specific technical problems and existing production process improvements."

AMENITIES

The quality of life—the availability of recreational and cultural facilities, the cleanliness of the environment, the freedom from congestion and crime, and the quality of local schools—is an important consideration in the location decisions of

some companies. If a firm is not tied to a large labor pool, raw materials, or rail or water linkages, then the attractiveness of a location as a place to live may play an important role. The importance of the climate in Wheat's (1973) analysis is one illustration of this.

The most important effects of differential levels of amenities would be through the migration patterns of households. Executives may encourage the relocation of their company to an area they find attractive as a place to live. Amenities may provide a small monetary incentive for relocation as well. Workers who live in pleasant, unpolluted, and uncongested surroundings will accept lower wages (Izraeli, 1973). In a study of the economies of air pollution abatement in Chicago, Cohen, Fishelson, and Gardner (1974) estimated that the average annual benefits from cleaning the air in Chicago to meet federal standards would be about $300 per household. This figure is quite close to estimates in a number of other studies. As much as half of the benefits of the change may be reflected in reductions in the wages necessary to attract workers to Chicago (Izraeli, 1973). A firm with 100 employees located in a clean-air city may find that its wage bill is $15,000 per annum less than it would be in a more polluted city. Other important amenities may include the level and quality of cultural and recreational facilities. The distribution of these amenities may affect the degree of suburbanization as well as interregional moves. Climate and geography may have spurred the moves to the South, West, and Mountain areas, while problems of crime, pollution, and congestion may have encouraged suburbanization.[34]

LEADERSHIP

Leadership, both civic and entrepreneurial, is one of the most nebulous, yet perhaps one of the most important, factors in explaining shifting patterns of economic development. The topic has been an issue among economic historians for many years. Thompson (1965), in an anecdotal description of the fates of three cities, provides an excellent introduction to the subject. He describes the adjustment of Boston to the loss of employment in the footwear industry, once a major industry. Leadership, civic and private, he surmises, may have been important in developing the research industry as a substitute. He also discusses the importance of leadership in the emergence of Chicago rather than St. Louis as the dominant Midwestern city.

The importance of individuals, as city leaders or as leaders of private institutions, in the adaptation of a city to changing economic conditions is difficult to assess. Was it far-sighted administrators in municipal government and in local universities who led Boston to recovery from the extensive unemployment at the end of World War II?[35] Has the failure of some cities to diversify and capture growth industries resulted from their inadequate pool of natural endowments, from a failure of civic leaders to pursue an effective economic development policy, or from the failure of the policies themselves? In informal surveys, the attitude of

[34] The importance of amenities in determining interregional and intraregional patterns of population migration is discussed in the *Population and Residential Location* report.

[35] This was attributable to the migration of the shoe and textile industries to the South.

local officials appeared quite frequently as an important determinant of locational choice.[38]

An attempt has been made to measure the leadership quotient in a number of small communities and to correlate this, together with other factors, with the rate of income growth in a number of small Missouri municipalities (CONSAD, 1969). The research concluded (p.1-11):

> The least successful areas seemed to lack business-oriented entrepreneurial leadership. This may be a serious drawback for such areas since entrepreneurial leadership can more readily communicate with industrial prospects than can non-entrepreneurial leadership. However, entrepreneurial leadership may be more interested in personal economic gain than in helping the unemployed.

Municipal leadership may often arise from within the Chamber of Commerce. From a series of case studies of economic recovery in New York State, Beckman (1974, p. 66) concluded:

> The fact that the Chamber of Commerce, the Development Agency, the schools, the city and town governments, the power and light company, sometimes even the local citizenry in a fund raising campaign, are jointly contributing to induce a company to settle there has proven a potent factor in successful retention and acquisition of industry.

What factors may lead to the appearance of local entrepreneurial talents is not known. Thompson (1965) offers tentative support for a "long-wave" cycle in a city's industrial activity resulting from the cyclical appearance and acceptance of innovations and far-sighted managers. In this respect, federal education programs, federal sponsorship of research, and the dissemination of information, together with loans to small businesses, may be helpful. However, measuring and predicting the results of these programs is very difficult.

GENERAL CONCLUSIONS

The number of factors that affect industrial behavior is large, and the avenues through which their effects are felt are diverse. Both measurement problems and interaction effects make it analytically difficult to separate the influence of individual factors. However, some consistency in the patterns of factor effects does emerge. The major factors and the principal ways in which they have operated on the employment shifts from central cities to suburban areas and to growth regions are depicted in Fig. 4.4.

Markets

Movements in population may have been the single most important factor in explaining differences in economic growth among regions and the suburbanization of employment. Population has migrated from the Northeast and North Central areas to the West and South. There has also been a movement away from large cities toward smaller urban areas, suburbs, and nonmetropolitan areas. These

[38] See Hartzell (1972) whose results are reproduced above. See also Beckman (1974) who reports on a number of case studies of upstate New York towns that have successfully attracted businesses.

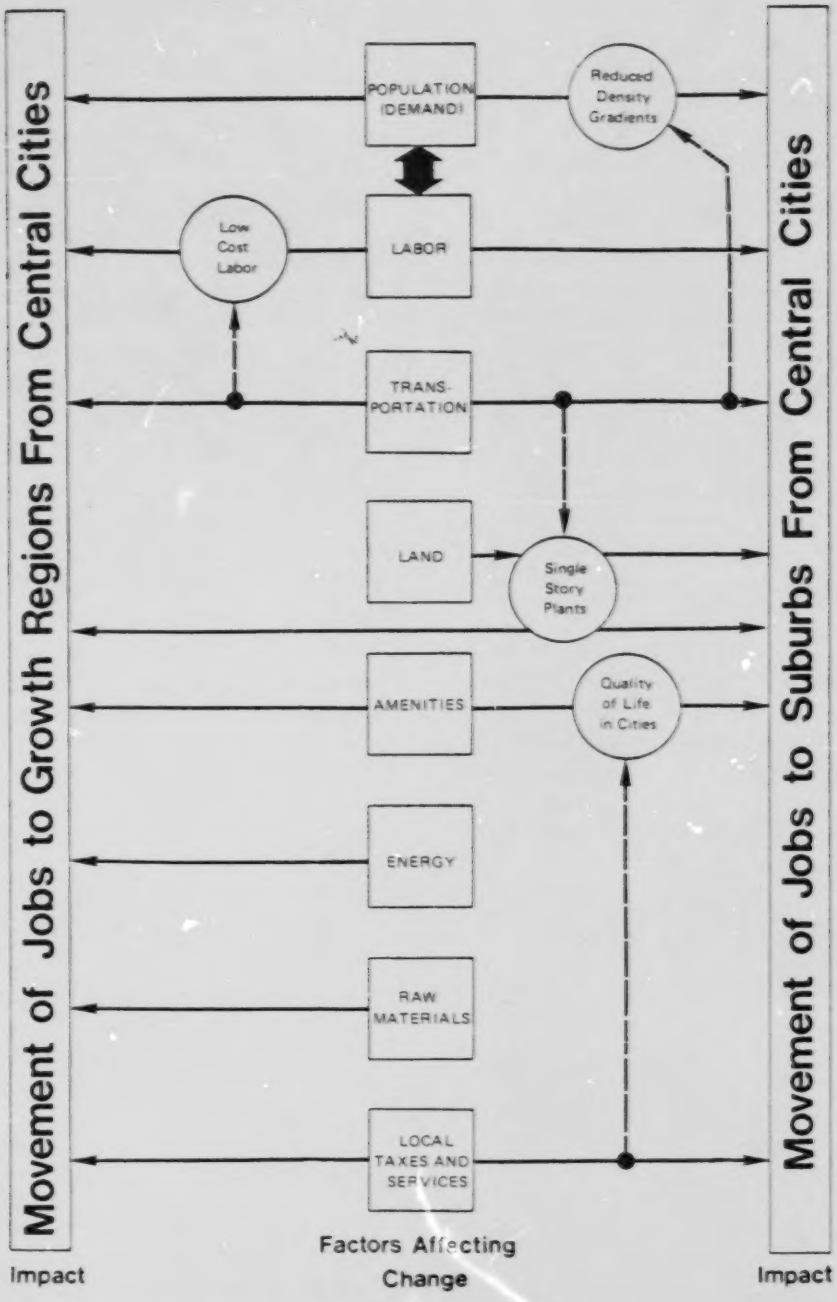


Fig. 4.4—Major factors affecting employment shifts from central cities to suburbs and to growth regions

changes have been caused by rising incomes, improved transportation systems, and the pursuit of an improved environment.[37] Although some households have moved to seek jobs, there is mounting evidence that companies have followed population rather than vice versa.

Population growth offers businesses growing demand for output and also a growing labor supply. Local service industries—wholesale, retail, and personal services—have responded to the growth in demand, while others have responded to growth in labor supply. It is difficult to separate these effects empirically. The rapid employment growth in areas where labor force participation has been below average has probably been in response to untapped and plentiful labor supplies.

Intermediate markets are also an important locational determinant for some industries. Industries tend to cluster together spatially in a distinct and predictable way.

Transportation

The extension of the federal interstate highway system and the growth of trucking have opened up many regions where prohibitive transportation costs had previously stifled industrial development. The decline in importance of the railroad and the increased importance of trucking has allowed rapid growth in areas not served by rail networks. Highway-oriented new towns in the South and West have grown at the expense of railway-oriented cities in the Northeast.

Increased reliance on private automobiles, congestion in the central city, and construction of commuter highway systems have encouraged the suburbanization of population. The increase in the cost of transporting labor relative to the cost of transporting raw materials may have caused some firms to relocate in suburban areas closer to the residences of skilled labor. Firms relying on low-skilled labor have remained behind in central city locations. Increased use of truck transportation, together with the emphasis on single-story, linear-flow manufacturing plants, has also encouraged the relocation of manufacturing jobs in suburban locations.

Labor

Regional differences in employment growth have been associated with regional differences in labor productivity. Above average employment growth in manufacturing has occurred in regions whose labor productivity (measured by the value added per worker) was above the national average. The differential rate of growth of employment in manufacturing among regions has narrowed regional differences in labor productivity, which might indicate a narrowing of regional growth differentials in the future.

Local labor productivity is linked to the education level of the local population. The higher the median years of schooling completed by the local population, the higher is labor productivity; therefore, the availability of local training programs and the quality of the local educational system may play a role in attracting companies to an area. The education level of the population in suburban areas has tended to increase more rapidly than that in central cities, which may have encouraged

[37] Reasons for interarea migration of households and for the suburbanization of population are discussed in the *Population and Residential Location* report.

the suburbanization of firms seeking skilled labor. However, a large pool of unskilled labor attracts some firms to central city locations, particularly if effective public transportation services are available.

There is little evidence concerning the effects of wage differentials on local economic development. High wages do act as a deterrent for some industries. Wage levels are less important than the cost of labor relative to its productivity. There is no evidence to suggest that a high rate of unionization causes slow employment growth, although unionization does lead to higher wages. However, slow employment growth may lead to a decline and fast growth to an increase in the rate of unionization. Some companies have cited high rates of unionization as reasons for leaving the Northeast. There is no evidence that the presence of a concentration of minorities in the local labor force deters economic development.

Land

The development of single-floor production techniques together with increased reliance on trucking may have encouraged some firms to seek locations in growth regions where land is cheap. There is little evidence concerning the relative importance of land, although the use of truck transportation may have introduced more land-intensive plant designs, thereby encouraging suburbanization. High prices in central cities may have displaced manufacturing activity with commercial activity and encouraged the suburbanization of certain service industries, including wholesale and retail firms. Overall, however, the availability of suitable land in central city locations does not appear to have been a factor in central city employment loss, although local regulations concerning the use of land—zoning restrictions and planning permissions—may deter industrial expansion.

Raw Materials

Decreased reliance on location near raw materials has allowed the decentralization of industrial activities from sites near sources of raw materials and has reduced the comparative advantage of locations in traditional manufacturing centers.

Energy

There is a wide range in the costs of energy at alternative locations. Although for most industries energy costs are less than 1 percent of the value of shipments, the wide range of prices may lead to differences in economic development. The Northeast is the most expensive region in this regard. There is tentative evidence that the energy intensity of an industry may be inversely related to its success in the Northeast.

The fact that labor and energy are substitute factors of production implies that, in locations where energy costs are high, manufacturers will use more labor-intensive techniques, leading to a higher level of employment but lower per capita earnings.

Taxes and Public Services

There is very little empirical evidence that local taxes influence industrial

location decisions or explain differences in growth rates among regions. This may be because of difficulties in measuring their incidence, including capitalization of tax and service differentials in land values, and to the type of analytic models used, rather than because taxes are unimportant. Tax breaks given by local governments to attract companies may not have much influence.

The quality and availability of local public services may play a role in location decisions among a number of alternative municipalities in a selected region. Local bureaucratic red tape may also slow down local economic development.

Amenities

Rising income has allowed individuals to purchase an improved environment. Population has moved toward attractive climates in the South and West, leading to growth in demand and labor supply. Households have even accepted lower wages for the opportunity to live in an improved environment. Households have sought improved residential amenities—more parks, less pollution, and a lower crime rate—by moving to the suburbs. The fiscal problems in some central city areas have led to reduced expenditure on amenity-determining services—including crime prevention, recreation, cultural affairs, and water treatment—leading to outmigration.

Other Factors

A number of other factors may have played a role in location decisions, but the empirical evidence is slight. The availability and cost of loans appear to vary between regions. This may be especially important to small firms that must rely on local bank loans as a source of funds.

There is evidence that, for some industries, there are economies of scale or economies of agglomeration. Industries that are concentrated in a particular location grow or decline more slowly than nonconcentrated industries. The established, large, industrial cities have a comparative advantage in this respect. Central cities may also offer advantages not available at suburban locations of face-to-face interaction because of their diverse economic structure. However, rapid improvements in communication technology have reduced the importance of face-to-face interaction. Civic leadership, the ability to formulate far-sighted policies and to grasp opportunities, although difficult to quantify, may play a decisive if ill-defined role in economic development.

V. THE INFLUENCE OF FEDERAL POLICIES ON THE DEMAND FOR GOODS AND SERVICES

This section analyzes how federal policies affect the level and distribution of demand through macroeconomic stabilization and growth policies, direct federal purchases of goods and services, and federal transfer payments. Section VI will review policies that affect the availability and the prices of productive factors. The policies discussed include the incentive effects of the tax structure, the regulation of factor markets, and subsidies. The separation of the two sections may be seen as one of policies affecting demand and those affecting supply. However, it is difficult to make a rigid distinction in all cases since some policies affect both demand and supply. For example, the personal income tax affects disposable income and therefore demand, but it also affects the willingness of workers to supply labor and therefore the availability and market price of labor.

FRAMEWORK FOR POLICY IMPACT ANALYSIS

The broad study of the urban effects of federal policies has been divided into three sectors: business, residential, and the local public sector. This report is concerned with the influences of federal policies that act *directly* upon the local business sector. (The framework of the policy impact study is shown in Fig. 5.1.) Local economic development is also affected *indirectly* by federal policies that act primarily upon the local residential and public sectors. These policies are discussed in *Population and Residential Location* and *Fiscal Conditions*, respectively. The linkages between these sectors and local economic development were discussed in Sec. IV and will be reviewed only briefly here.

The residential sector influences the local business sector through the demand for goods and services—the market for output—and through the availability of labor. Changes in the distribution of population, both between city and suburb and among regions, have played a major role in changing the distribution of employment opportunities. Federal policies that have aided the redistribution of population include highway construction, tax allowance on mortgage interest payments, and income transfer programs.

The local public sector influences economic development through the local tax rates on businesses and through the quality and availability of local public services. Unfortunately, little is understood concerning these relationships. Federal policies that act directly upon the local public sector include categorical grant programs and tax provisions allowing tax exemption on interest payments for local bonds.

The assessment of the effects of policies directly influencing the local business sector is concerned, primarily, with how much they differ among urban areas—either regionally, through affecting suburbs differently from central cities, or by type of area. In a number of cases, including the allocation of public construction projects and the distribution of local economic development funds, the selective geographical effects are the result of deliberate policy. For the most part, however,

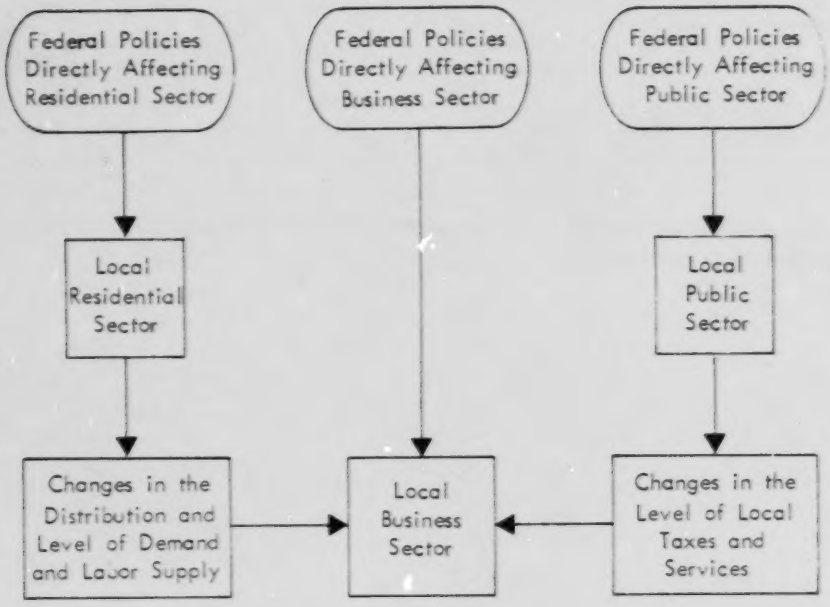

Federal Policies Directly Affecting Residential Sector
Federal Policies Directly Affecting Business Sector
Federal Policies Directly Affecting Public Sector
Local Residential Sector
Local Public Sector
Changes in the Distribution and Level of Demand and Labor Supply
Local Business Sector
Changes in the Level of Local Taxes and Services

Fig. 5.1—Framework of federal policy impact analysis

the favoring of some urban areas at the expense of others is inadvertent, arising either because the federal program is aimed at assisting certain groups of the population that are not distributed uniformly among all areas, or because a certain program has different effects according to the economic characteristics of an area. Examples of the first type of bias are transfer payments to the poor, which result in the distribution of income from areas with low numbers of poor to those with larger numbers. Examples of the second type of differential effect are policies that stimulate growth through reducing the cost of capital investment, assisting rapidly growing areas at the expense of slower growing areas.

One important limitation should be borne in mind. Although one may suspect that federal policies have exerted a considerable influence on urban economic development, too often there are neither research results nor data to substantiate the suspicion. Therefore, it is possible only to offer circumstantial evidence or to advance hypotheses, not findings, concerning the influence of federal policies.

This section examines three ways in which federal policies affect the demand for local goods and services, through macroeconomic stabilization policies, federal purchases of goods and services, and income transfer programs. Macroeconomic policies attempt to dampen fluctuations in the aggregate rate of growth of employment and to encourage long-term growth. The relationship between national and local rates of growth therefore measures an important link between federal policies and local economic developments. Fluctuations in the national level of output affect the level of demand for the output of any one area by all other areas in the country, as well as the level of local demand. This is described in the last subsection as is the influence of specific stabilization instruments, including tax rate changes, public

works, and public employment programs. Second, the level and distribution of federal puchases of goods and services affect the level of demand for local goods and services. Third, federal transfer payments, including welfare, social security, and unemployment insurance, affect the level of local demand for goods and services. The aggregate of these three components of demand—export demand by other areas, federal demand, and local demand—defines total demand for local goods and services. The level and growth rate of total demand will exert a profound influence on local economic development. Figure 5.2 shows these avenues of federal influence schematically.

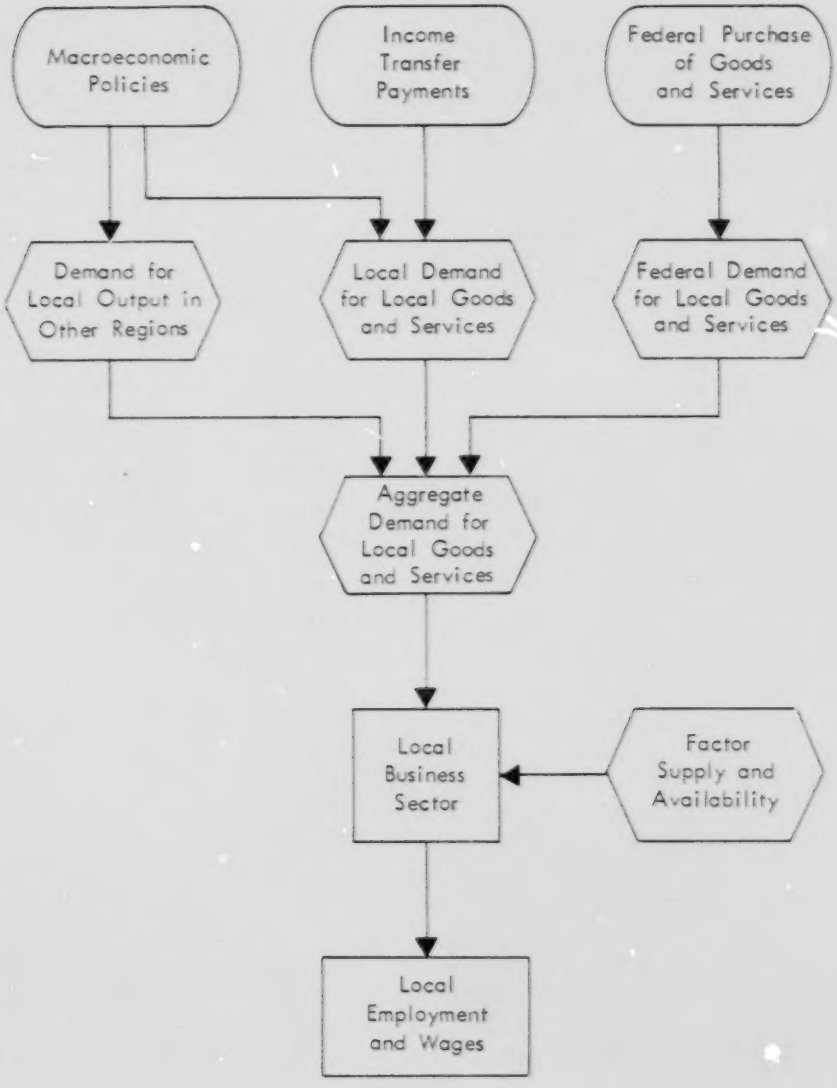

Macroeconomic Policies
Income Transfer Payments
Federal Purchase of Goods and Services
Demand for Local Output in Other Regions
Local Demand for Local Goods and Services
Federal Demand for Local Goods and Services
Aggregate Demand for Local Goods and Services
Local Business Sector
Factor Supply and Availability
Local Employment and Wages

Fig. 5.2—Federal policies influencing demand for local goods and services

FEDERAL MACROECONOMIC POLICIES

Following the New Deal and the increase in federal involvement in economic activity during World War II, a low level of unemployment, a high rate of growth, and stable prices have been primary goals of federal economic policy. A number of monetary and fiscal instruments have been used, including adjustments in personal and business tax rates, investment tax credits, changes in the money supply, and public works and public employment programs. Taken together, the aggregate levels of federal expenditures, revenues, and deficits influence the growth rate and the level of output and employment. As the national economy responds to the expansionary or dampening influence of federal policies, urban areas respond individually, conditioned by their industrial structure, geographic location, and other factors. In addition to their aggregate influence on economic development, each growth and stabilization instrument may have a sectoral, regional, or urban influence on economic development. For example, public employment programs may be concentrated in large urban areas and investment tax credits may assist growth regions.

Local Response to Aggregate Economic Growth

The secular growth rate of the national economy and fluctuations in that rate, known as business cycles, are not reflected in all urban areas in the same way. Areas differ in their *responsiveness* to changes in the national growth rate, in the degree to which they *conform* to national cycles, and in their secular growth rate. For example, in some areas, the local growth rate declines sharply in response to a gradual slowdown at the national level while other areas experience no slowdown at all. Some areas may not be very volatile, but their pattern of growth nevertheless conforms to that of the nation. If the nation expands, they also grow, and if the national employment level declines, they experience a decline but their fluctuations are slight. Finally, some areas exhibit low secular growth rates, such that, although they may parallel the nation, it is at a much lower rate. If the nation fails to grow rapidly, these areas will experience a decline in employment.[1] Figures 5.3, 5.4, and 5.5 map these three characteristics of local economic development—conformity, responsiveness, and secular growth rate—for 147 labor market areas. There is a considerable range of response among urban areas to changes in the aggregate level of economic activity.[2]

City Versus Suburb. Employment has grown more slowly in central areas than in suburbs or nonmetropolitan areas. This differential is greater during periods of expansion than during periods of contraction (Table 2.2). Central city growth

[1] A review of literature relevant to regional and local response to national cycles is contained in Vaughan (1976), Sec. III; and some detailed empirical research is reported in Vernez et al. (1977).

[2] To measure local response, the local monthly rate of growth of employment was regressed against the national employment growth area. The coefficient of determination (R^2) measured the conformity of the area with respect to national changes, the estimated value of the coefficient (β_i) measured the responsiveness of the area to changes in the national growth rate, and the constant term (α_i) is a measure of the local growth rate that is to be expected when the national growth rate is zero. The form of the regression was

$$e_t^i = \alpha_i + \beta_i e_t^n + \mu,$$

where e_t^i was the growth rate of employment in month t in area i, α_i is a constant term, β_i is the estimated coefficient, e_t^n is the growth rate of employment in month t in the nation, and μ is a random disturbance term. For full results, see Vernez et al. (1977), App. D.

Fig. 5.3—Conformity of labor market areas (R^2) with respect to national employment growth, 1960–1975

SOURCE: Georges Vernez et al., *Regional Cycles and Employment Effects of Public Works Investments*, The Rand Corporation, R-2052-EDA, January 1977.

rates are more similar to those of their suburban areas during recessions than during periods of rapid growth.

Urban Areas in Different Regions. Figures 5.3, 5.4, and 5.5 indicate certain conclusions concerning the differential response of urban areas in different regions. These may be summarized as follows:

- *New England.* Uneven responsiveness, low conformity, and a very low growth rate.
- *Middle Atlantic.* Low responsiveness, very close conformity, and very low growth.
- *East North Central.* Very high responsiveness, very close conformity, and very low growth.
- *West North Central.* Uneven responsiveness (some very low), uneven conformity, average growth rates.
- *South Atlantic.* Uneven responsiveness, low conformity, and low growth.
- *East South Central.* Uneven responsiveness, low conformity, and low growth.
- *West South Central.* Uneven responsiveness, mixed conformity, and uneven growth.

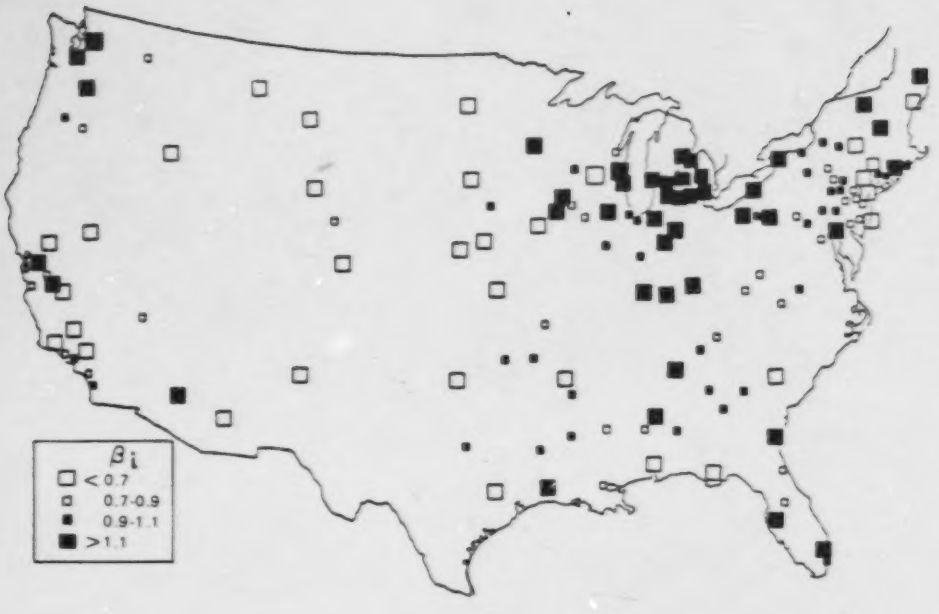


Fig. 5.4—Responsiveness of labor market areas (β_i) with respect to national employment growth, 1960–1975

SOURCE: Georges Vernez et al., *Regional Cycles and Employment Effects of Public Works Investments*, The Rand Corporation, R-2052-EDA, January 1977.

- *Mountain.* Very low responsiveness, very low conformity, and high growth.
- *Pacific.* Northwest: high responsiveness, mixed conformity, low growth; California: low responsiveness, mixed conformity, high growth.

Different Types of Urban Areas. A number of urban characteristics are important in determining the response of an area to the growth rate of aggregate employment. First, large cities generally conform more closely to the nation and have response rates that are closer to unity than smaller urban areas (Vernez et al., 1977). This is probably because large areas more closely reflect the industrial composition of the nation as a whole than do small areas. Large areas also tend to grow somewhat more slowly than smaller areas. Urban areas with a high share of their labor force engaged in the manufacturing of consumer durables tend to experience cycles of high amplitude (Engerman, 1968). Generally, however, industrial composition has played a declining role in explaining differences in cyclical response among areas (Borts, 1960).

In addition to their influence on employment growth, aggregate macroeconomic policies are associated with changes in the rate of inflation.[3] Expansionary mone-

[3] Changes in the money supply can be generated by printing money, lowering reserve requirements, or purchasing on the open market.

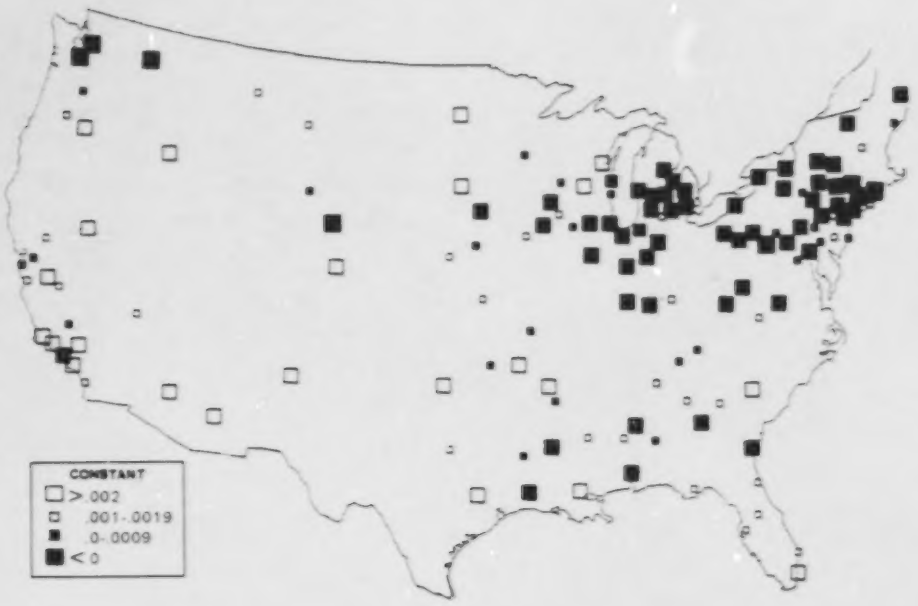


Fig. 5.5—Secular employment growth of labor market areas (α_i), 1960–1975

SOURCE: Georges Vernez et al., *Regional Cycles and Employment Effects of Public Works Investments*, The Rand Corporation, R-2052-EDA, January 1977.

tary and fiscal policies are associated with rapid increases in the cost of living, while restrictive policies lead to slow rates of price increase. The relationship is subject to considerable lags, however, and is not well understood.[4]

There is some evidence that the price level in large central cities is above that for the nation as a whole.[5] This difference apparently widened during the high rate of inflation in recent years. Therefore, to the extent that monetary policy leads to inflation, it may contribute to the economic problems in large central cities. Between 1967 and 1974 the consumer price level rose by 47.7 percent in the nation as a whole but by 50.2 percent in metropolitan areas with population in excess of 3.5 million, by 47.0 percent in SMSAs of between 1.4 and 3.5 million, and by 46.7 percent in other SMSAs.[6] Relative prices of food, housing, transportation, and health items in the largest SMSAs increased more than prices elsewhere; only the prices of apparel and household upkeep have increased slowly.

[4] For some contributions to the debate, see Friedman and Schwartz (1963), Ando and Brown (1963), Anderson and Jordan (1968), Keran (1969), Willes (1971), and Blinder and Solow (1975).

[5] See Bureau of Labor Statistics, *Handbook of Labor Statistics*, U.S. Department of Labor, Washington, D.C., published annually.

[6] Ibid., 1976.

How much the high cost of living in large SMSAs can be attributed to inflation remains unclear. Baumol (1967) has argued that the price increase in large cities may be due to concentration of the urban labor force in sectors in which the productivity of labor is constant or growing slowly.[7] He hypothesizes (p. 419) that if "productivity per man hour rises cumulatively in one sector relative to its rate of growth elsewhere in the economy, while wages rise commensurately in all areas, then relative costs in the nonprogressive sectors must inevitably rise, *and these costs will rise cumulatively and without limit.*" The share of the urban labor force in manufacturing has declined sharply, and that sector enjoys productivity increases;[8] the share of labor in sectors that experience little increase in productivity has increased. This may have contributed to the high cost of living in cities. The effect of monetary policy on cities remains unclear.

Stabilization Instruments

Automatic Fiscal Stabilizers. The structure of federal economic and social programs has resulted in a number of "built-in" economic stabilizers. For example, as unemployment increases, unemployment insurance payments and welfare payments also increase. These federal outlays partially compensate for the income lost during the recession and, therefore, tend to limit the decline in consumer expenditure. At the same time, federal tax receipts decline and disposable income therefore does not fall as rapidly as do earnings. Automatic stabilizers require no discretionary administrative action; therefore, they are carried out immediately, and they are designed to channel aid to the most heavily affected areas. They are also large.

Teeters (1971) estimated the increases in public expenditures that would have resulted from an unemployment rate of 6.0 percent rather than 4.2 percent for a number of years. In 1971, an additional $7.8 billion would have been spent. By 1973, the figure would have been $14.9 billion, of which $12.3 billion would have come from federal rather than local government programs. The largest single component of this increase was unemployment compensation, at $4.7 billion. In 1973, unemployment of 6 percent rather than 4.2 percent represented a loss of about $80 billion in the GNP. Tax receipts (federal and local) would have fallen nearly $24 billion, and public expenditures would have risen $15 billion. Automatic stabilizers therefore would account for nearly half of the "gap." Local governments appear to act procyclically in the aggregate, reducing employment during recessions as tax receipts decline and expanding employment during periods of expansion.

At present the degree to which automatic stabilizers discriminate in favor of or against urban economic development is unknown. Central cities may receive a less than proportional share. In addition, the increased burden during a recession of welfare and welfare related payments has probably contributed toward fiscal problems in central cities. The share of the populations supported by welfare payments in central city areas is at least double the share of suburban areas.[9] The welfare caseload increases as the unemployment rate rises (Rydell et al., 1974). Even though a substantial portion of welfare expenses is met by federal and state

[7] He cites teaching and live performances in theatre, opera, and music as examples.

[8] From 32 percent of the nonagricultural labor force in 1960 to 28 percent in 1972.

[9] New York City, with 4 percent of the nation's population, has 10 percent of the nation's welfare recipients (Rydell et al., 1974).

governments, the increase in costs during a recessionary period can create a considerable fiscal burden for central city residents.

Personal Income Tax.[10] Variations in personal income tax rates and tax rebates and surcharges have been popular stabilization devices. Tax cuts were used in 1962 and 1975 to stimulate the economy, and a tax surcharge was imposed in 1968 to dampen demand. Since variations in tax rates affect payroll deductions, it is possible to affect disposable income immediately. Aggregate consumption demand can be affected substantially since, on average, only one of every 14 dollars of personal disposable income is saved. Ando and Brown (1963) found that changes in the personal income tax could operate as a powerful short-run stabilizing device. They concluded that changes could be legislated easily, that new tax schedules could be carried out quickly, and that households could respond significantly to these changes. However, Eisner (1969) has argued that household consumption is determined by permanent rather than transitory income, and a temporary tax cut will have little effect on permanent income or consumption.

The degree to which tax rate changes affect urban areas depends upon the form in which the tax changes are carried out and upon the characteristics of central city populations. Median household income in central cities in 1970 was only 83 percent of the median household income in suburban areas.[11] The share of the central city population below the poverty level and receiving welfare payments is double the share in suburban areas, and the unemployment rate in central cities during the 1974-75 recession exceeded that in the suburbs. Therefore, to the extent that per capita effects of a tax rate change are proportional to the per capita level of income and the share of the population that is paying taxes, central cities will receive a smaller benefit of a tax reduction than suburban areas. Reductions in the personal income tax rate or increases in allowable deductions will favor regions where per capita incomes exceed the national average. These include the Northeastern and Pacfic regions. For Northeastern central cities, the suburban bias is offset to some extent by the regional bias.

Corporate Income Tax. Investment is one of the most difficult components of aggregate demand to predict and to influence systematically through fiscal policy. Investment decisions typically concern long-term plans for the construction of operating facilities. The important and often destabilizing exceptions are decisions about inventories, which can be increased or decreased quickly.[12] It is by no means clear that increases in the corporate tax rate during overheated expansion[13] or reductions during recessionary periods have any effect on aggregate spending levels. In fact, they may have a perverse, procyclical effect (Eisner, 1969).

The uncertainty regarding the direction and even the existence of any response to changes in the corporation income tax rate makes it difficult to assess the urban effects of these changes. However, the fact that the corporation income tax will fall more heavily on companies with high incomes and offer greater incentives to investment in new equipment and facilities may imply that reductions in tax rates,

[10] The effects of the personal income tax on the supply of labor are discussed in Sec. VI.

[11] The ratio of central city to suburban median household income varied among regions. It was 79 percent in the Northeast, 86 percent in the Midwest, 93 percent in the West, and 96 percent in the South, in 1970.

[12] Inventories refer to stocks of both finished output and inputs.

[13] This was used in 1968.

if they have any effect at all, will benefit companies located in growing areas. They will therefore favor suburban areas and areas not in the Northeast.

Investment Tax Credits and Surcharges.[14] The *direction* of the effects of an investment credit or surcharge is less ambiguous than the effects of changes in the corporate income tax. A credit will stimulate investment and a surcharge will reduce investment, especially if it is established that they are temporary. Credits have the added advantage that they could be and have been applied regionally, by offering distressed areas or areas with high cyclical unemployment a greater credit/surcharge differential during recessionary periods. However, little is known about the size of the response to changes in credits and surcharges. It is therefore difficult to assess the multiplier effect of federal dollars forgone or collected through these changes. Tax credits, applied without regional targeting, generally represent a subsidy to growth areas where the rate of increase in the capital stock is large. In Table 5.1 areas that grew faster than the nation as a whole, including the South Atlantic and West South Central divisions, are shown to have enjoyed a larger share of total new national investment in manufacturing than of manufacturing

Table 5.1

MANUFACTURING EMPLOYMENT AND NEW INVESTMENT SHARES AND RELATIVE GROWTH OF REGIONS IN THE UNITED STATES, 1972

Region	Share of Manufacturing Employment	Share of Total Investment in Manufacturing	Above (+) or Below (-) National Growth, 1963-72
New England	7.2	5.3	-
Middle Atlantic	20.9	17.7	-
East North Central	26.1	25.0	-
West North Central	6.4	5.4	+
South Atlantic	14.4	15.9	+
East South Central	6.6	6.5	+
West South Central	6.6	11.3	+
Mountain	2.0	3.0	+
Pacific	10.4	9.8	-

SOURCE: Bureau of Census, *Statistical Abstract of the United States, 1973*, U. S. Department of Commerce, Washington, D. C., 1974.

employment (with the exception of the West North Central region). The tax credit represents a higher per worker subsidy in these regions than in slow-growth regions. Since employment growth rate and the unemployment rate are negatively related (Tideman, 1973), investment tax credits help healthy areas at the expense of those areas that are growing slowly.

Investment tax credits may have provided greater per capita assistance to suburban and nonmetropolitan areas than to central city areas. First, employment

[14] Credits (surcharges) could take a variety of forms. In their simplest, a cash rebate could be sent (demanded) for each $1000 of investment that is carried out. Alternatively, the allowable depreciation rate could be speeded up (slowed down), or the percentage of investment allowed as a tax deduction could be increased (reduced). The last method may be less effective as a stimulant than the previous two, since, during a recession, many companies may be in the position of earning a very low income, or even operating in the red, and therefore the reduction in taxable income may have no effect. These methods have been used in France, Great Britain, Japan, Sweden, and West Germany.

in central cities has been expanding more slowly than elsewhere; therefore, credits favor suburbs at the expense of central cities. Second, establishments in central cities tend to be more labor-intensive (and therefore less capital-intensive) than those in suburban areas.[15] The implicit temporary subsidy to capital therefore favors companies that are not in the central cities.

Public Works Programs. Public construction expenditures have fluctuated between one-fourth and one-third of total construction expenditures in the United States during the last two decades. In 1972, public construction put in place was $30 billion out of a total of $124 billion. Expenditures of this volume may have a considerable effect on both the aggregate level of economic activity and upon its regional distribution. Not only is employment increased during construction of public facilities, but once in place, the facilities generate employment through operation and maintenance activities and through investment in complementary private facilities. For example, a hospital with a large staff will increase employment in local services as well as in the manufacturing companies that produce medical supplies. Some federally funded construction, particularly transportation systems and industrial parks, may enhance the local comparative advantage.

There is little direct evidence on which to base an answer to the question of whether federal construction expenditure has produced any regional or urban biases in economic development. However, partial answers can be obtained from several quarters.

Construction projects that receive federal support are more often associated with the construction of new residential and commercial areas than with redevelopment.[16] Large federal expenditures have therefore created a subsidy for growth at the expense of maintenance, thereby aiding the movement to the sunbelt and to new suburbs. In addition, there is some evidence that central city areas and large cities have received a disproportionately small share of accelerated public works projects funded by EDA and deliberately speeded up during recessionary periods.[17] This is partly because of the types of projects that can be readily speeded up. Hoeber (1964) reports that 48 percent of the projects speeded up during the 1962-63 recession were waste treatments, water, and sewer projects. New construction of these facilities tends to be located in suburban and growth areas that have a menu of projects already planned.[18]

Public Employment Programs. Public employment programs have become increasingly relied upon to generate jobs during recessionary periods. Such programs emphasize job creation in the public and private sector through incentive schemes, regulations, or direct government grants. The Public Employment Program was created in 1971, and spent $1 billion in FY 1972, $1.25 billion in FY 1973, and $0.25 billion in FY 1976. It has now been replaced by the Comprehensive

[15] Payroll tends to take a higher share of value added in manufacturing industries in central cities than in central city areas (unpublished Rand research).

[16] In this respect, the *Public Works Employment Act of 1976* represents a break with the past, since it explicitly includes renovation and repair as categories of projects.

[17] Although the 243 SMSAs in the nation contain two-thirds of the nation's population, they receive only one-quarter of EDA's construction funds (CUED, 1975). Cities with populations in excess of one-half million received less than 2 percent of the funds allocated under the Public Works Impact Program, 1972-1973, although they contain more than 16 percent of the population (Sulvetta and Thompson, 1975). The formula used to allocate funds under the Local Public Works Program of 1976 includes the logarithm of unemployment as a variable, which deliberately discriminates against large cities.

[18] These types of projects are only about 10 percent of total public construction, however.

Employment and Training Act (CETA) of 1973. By June 1975, a total of 310,000 local-government jobs had been financed under this program. However, a major problem with assessing the local employment effects of public employment schemes is that it is not clear how much these jobs represent a net increase in public sector jobs or simply the substitution of federally funded for locally funded jobs. This substitution may entail some local tax relief, which will stimulate local demand. It is unclear how much the distribution of CETA funds reflects the relative severity of local recessions.

There is some evidence concerning the allocation of public employment funds by type of jurisdiction. Central cities, which typically have a large share of their workforce in municipal employment, have gained a higher per capita share of CETA funds than suburbs and nonmetropolitan areas, and large cities have gained more than small cities (Friedlander, 1976). The allocation has also been higher to those cities with large numbers of unemployed (Wiseman, 1976). To what extent that has helped the process of economic development is uncertain. Friedlander argues that development is unlikely since the programs do not provide capital to create jobs in the private sector; and training for participants, so they can secure a job in the private sector when countercyclical funds dry up, is negligible.

PATTERNS OF FEDERAL EXPENDITURE AND REVENUE COLLECTION

The federal government spends billions of dollars annually for the purchase of goods and services and in salaries for federal employees. The volume of these expenditures, the types of goods and services produced, and the location of the companies supplying the federal government may exert a profound influence on the level of demand facing companies in any given location.[19]

The *National Journal* examined the regional patterns of federal tax receipts and federal spending, which reveals that some regions received considerably more in federal spending than they paid in taxes. Per capita tax revenues and spending are shown in Table 5.2. New England, Mid-Atlantic, and the East and West North Central regions all received less, per capita, in spending than they paid in taxes. These are also regions in which employment and income grew more slowly than in the nation as a whole in 1960-1970, and they enjoyed above average per capita income and labor force participation. To the extent that regional patterns of federal expenditure have contributed to the disparity in regional growth rates, they have helped to erase regional income and employment inequalities.

The distribution of federal expenditures should not be regarded as a deliberate regional policy. The movement of the aerospace industry to California, in part to take advantage of the clear skies, has resulted in defense contracts in that state of $382 per capita, whereas the national average is only $201. There are also undoubted spillover effects among regions resulting from these expenditures. Aircraft manufacturers in California place orders for steel from mills in Indiana and Ohio.

The changes in the regional distribution of demand are undoubtedly important in determining the relative growth rates in different locations. Federal purchases

[19] A number of studies have estimated the regional and sectoral effects of alternative patterns of federal spending. See, for example Bezdek (1971, 1972, 1974a), Bolton (1966), and Polenske (1969).

Table 5.2

PER CAPITA FEDERAL TAXES COLLECTED AND SPENDING, BY REGION, FY1975

Region[a]	Spending Per Capita[b] (dollars)	Taxes Per Capita[c] (dollars)	Spending/Taxes Ratio	Defense Contracts Per Capita (dollars)	Defense Salaries Per Capita (dollars)	Highways and Sewers Per Capita (dollars)
New England	1470	1533	.96	382	70	48
Mid-Atlantic	1325	1594	.83	175	55	36
East North Central	1064	1518	.70	96	52	54
West North Central	1287	1374	.94	177	91	60
South Atlantic	1454	1303	1.12	161	228	57
South Central	1327	1137	1.17	168	161	46
Mountain	1615	1238	1.30	174	214	95
Pacific	1745	1497	1.17	382	209	57
Nation	1412	1412	1.00	201	132	54

SOURCE: The *National Journal*, June 26, 1976, pp. 821-824. Reprinted by permission of the *National Journal*.

[a]The regional definitions correspond to census definitions of divisions except in the case of the South Central region, which includes both the East and the West South Central divisions.

[b]Measures per capita federal spending in FY 1975 excluding interest payments.

[c]The federal tax burden per person with the federal deficit distributed as an added tax.

of goods and services strongly affect labor income. Polenske (1969) calculates that in 1962, only 17 percent of national labor income was dependent upon federal government purchases. This ranged from only 9 percent in Minnesota, Wisconsin, and Michigan to 33 percent in Maryland, Virginia, West Virginia, Delaware, and the District of Columbia. Federal purchases also accounted for a wide range in shares of industrial output, from 33 percent of the labor earnings in the electrical equipment industry in 1962 to less than 1 percent in the apparel industry. Changes in the allocation of federal expenditure among programs and changes in the selection of suppliers since World War II have created considerable differences in the distribution and levels of employment among regions. Some measure of this can be gained from Table 5.3, which shows per capita labor earnings from federal expenditure for a number of states or groups of states for 1947, 1958, and 1962. New York, New Jersey, and Pennsylvania exhibited low per capita levels and a low growth rate, which contributed toward their low employment growth rate.

There have been some attempts to change the pattern of federal purchases for economic purposes. The Area Redevelopment Administration encouraged the U.S. Department of Defense to purchase from suppliers located in depressed regions (Levitan, 1964). There was little, if any, diversion. The 1976 Annual Report of the Joint Economic Committee of Congress called for a deliberate policy of directing federal purchases toward slow growth areas in the Northeast.

The use of federal purchases as a deliberate policy device has several problems. First, some purchases are made through long-term contracts to federal specifications and could not easily be switched to other suppliers. Other purchases are for the day-to-day running of local federal installations—military facilities, national parks, or offices. Purchasing from a distant or less efficient supplier would be costly and inconvenient.

Federal expenditure patterns have encouraged economic development in those regions enjoying rapid growth rates. However, this has also reduced regional inequalities in income and employment opportunities.

Table 5.3

PER CAPITA FEDERAL GOVERNMENT LABOR EARNINGS,[a] BY REGION, 1947, 1958, AND 1962
(In 1958 dollars)

States	1947	1958	1962	Percentage Change 1947 to 1962[b]
New England	$185	$363	$395	113.2
New York	173	273	261	51.0
New Jersey, Pennsylvania	178	295	288	61.8
Ohio, Indiana, Illinois	158	295	295	86.8
Minnesota, Wisconsin, Michigan	99	190	202	103.9
North and South Dakota, Kansas, Iowa, Nebraska	118	249	249	111.6
Georgia, North and South Carolina	163	252	289	77.6
Maryland, Virginia, West Virginia, Delaware, District of Columbia	537	605	654	21.7
Florida	284	266	282	-0.7
Kentucky, Tennessee	136	211	229	68.7
Mississippi, Alabama, Louisiana	132	229	254	93.2
Arkansas, Oklahoma, Missouri	135	277	294	118.8
Texas	192	346	350	82.6
Idaho, Montana, Wyoming	260	245	281	8.4
Utah, Colorado, New Mexico, Arizona	267	438	480	79.7
Oregon, Washington	324	420	442	36.3
California, Nevada	386	563	560	44.8
National Average	203	326	339	67.2

SOURCE: Karen R. Polenske, *Shifts in the Regional and Industrial Impact of Federal Government Spending*, U. S. Department of Commerce, 1969.

[a]Includes direct payment of federal government wages and salaries and the labor earnings generated directly and indirectly by the federal government's final purchases of goods and services.

[b]As a percent of 1947.

The distribution of a number of functional categories of federal expenditures among types of urban, suburban, and nonmetropolitan areas for 1969 is shown in Table 5.4, which also shows the concentration ratios of each category in each type of area. The concentration ratio is defined as the percentage share of total expenditure in a given category divided by the percentage share of population in each type of area. A value greater than one for a given area indicates that the area receives an allocation of expenditure that is more than proportional to its population. Unfortunately, no regional disaggregation is available. However, this measure of concentration is based upon the number of residents in the type of county, and not on the number of jobs. Since central cities contain a large share of a metropolitan area's jobs, the apparent bias in favor of central cities may be misleading. Expenditures appear to be concentrated in central cities, in the richest and fastest growing counties, and in the slowest growing counties. Functional categories that were heavily concentrated in central cities included: agricultural programs not elsewhere classified (primarily food stamps); air and water transportation; urban mass transit; housing and community aids; recreation; elementary, secondary, higher,

Table 5.4

CONCENTRATION RATIO OF FEDERAL EXPENDITURES BY TYPE OF COUNTY, 1969[a]

Federal Program	% of Total Outlays[b]	Poorest Counties	Richest Counties	Slowest Growing Counties[c]	Fastest Growing Counties	Metropolitan areas >1,000,000	Metropolitan areas <1,000,000	Non-SMSA Urban Counties	Rural Counties	Central Cities	Suburbs	EDA Counties
Agri. Program NEC	3.5	1.43	1.65	3.07	0.42	0.67	0.56	1.38	1.95	1.47	0.23	0.95
Air Transportation	0.5	0.18	1.62	0.45	0.75	1.49	1.03	0.41	0.41	2.39	0.49	1.18
Water Transportation	0.5	0.11	4.28	3.54	1.04	1.86	0.52	0.95	0.22	4.33	1.04	1.32
Urban Mass Transit	(d)	0.00	4.37	3.37	0.13	2.19	0.60	0.03	0.01	3.22	0.54	1.36
Other Ground Transportation	2.4	1.37	0.64	1.25	0.87	0.73	1.04	0.94	1.43	0.77	0.62	1.07
Regional Development	0.2	4.05	0.23	2.92	0.82	0.38	0.40	1.23	2.74	0.89	0.05	2.07
Housing and Community Aids	1.2	0.70	1.42	1.44	0.59	1.27	1.07	0.77	0.57	2.21	0.55	1.20
Business & Farm Economic Opportunity Loans	2.1	1.86	0.24	3.23	0.38	0.13	0.39	1.94	2.82	0.22	0.17	0.87
Regional Development Loans	0.4	3.71	0.13	2.85	0.45	0.11	0.30	1.60	3.14	0.18	0.19	1.32
Mixed Regional												
Recreation	0.1	0.82	0.51	3.71	0.79	0.73	0.42	0.86	2.31	1.71	0.57	1.81
Elementary & Secondary Education	1.2	1.52	0.65	1.14	0.96	0.73	1.26	0.96	1.13	1.38	0.68	1.03
Vocational Education & Manpower Training	0.5	0.59	0.88	1.20	0.79	0.84	1.62	1.24	0.32	2.12	0.20	0.85
Housing Loans	6.9	0.40	1.10	0.49	2.06	1.24	1.23	0.68	0.44	1.03	1.23	1.00
Defense & Science												
Defense Payrolls	10.5	0.18	0.68	0.43	2.24	0.79	1.50	0.94	0.71	1.66	1.15	0.94
Defense Contracts	19.7	0.15	1.34	0.75	1.62	1.36	1.20	0.67	0.29	1.25	1.21	0.95
Atomic Energy	1.3	0.80	2.23	0.80	1.33	0.96	0.89	1.59	0.93	1.44	1.23	1.22
Space Research & Technology	2.0	0.04	1.27	0.12	2.80	1.86	0.55	1.18	0.06	1.50	2.32	0.38
Higher & Science Education	0.7	0.67	0.85	0.96	1.10	1.00	1.16	1.35	0.62	1.66	0.65	1.14
Other												
Postal Service	3.4	0.61	1.87	1.73	0.69	1.35	0.88	0.73	0.72	1.88	0.67	1.13
Health Facilities Construction	0.3	0.60	1.15	1.33	0.76	0.94	1.17	1.09	0.83	1.34	0.73	1.04
Health Service & Care	1.7	0.60	1.62	1.69	0.89	1.26	0.96	0.85	0.69	2.00	0.79	1.16
Retirement Payments	16.4	0.83	1.14	1.19	0.88	1.03	1.01	1.01	0.92	1.30	0.83	1.07
Other Income Security Payments	3.2	1.50	1.73	2.19	0.78	1.14	0.78	0.88	1.13	1.60	0.61	1.40
Educational Loans	0.1	0.71	0.53	0.65	0.54	1.22	0.92	1.14	0.67	2.99	0.42	1.38
Total Federal Expenditure	78.2	0.61	1.31	1.15	1.24	1.14	1.03	0.90	0.76	1.50	0.98	1.03

SOURCE: William Alonso, "Problems, Purposes and Implicit Policies for a National Strategy for Urbanization," U. S. Commission on Population Growth and the American Future, 1972, pp. 641-642.

[a]Concentration ratio is the ratio share of expenditures to the population in that type of area. May be interpreted as a per capita relative share.

[b]FY 1969.

[c]All of these counties were declining in population.

[d]Less than 0.1 percent.

and vocational education; defense payrolls and contracts; atomic energy and space research; postal service; health facilities construction and health care; retirement payments; other income security payments; and education loans. Categories in which central cities received a less than proportional share of expenditure were: other ground transportation (highways), regional development, business and farm economic opportunity loans, and regional development loans.

Large metropolitan areas (those with populations in excess of one million) enjoyed larger per capita federal expenditures than smaller ones; large cities have an advantage in the areas of water and mass transportation, recreation, space research, health care, and income security payments. Smaller SMSAs benefit from education payments, defense payrolls, and hospital construction.[20]

FEDERAL TRANSFER PAYMENT PROGRAMS

A large part of the federal budget is allocated for income redistribution programs. In 1975 over $110 billion dollars were spent on programs designed to provide increased income to low-income households: $85.2 billion was disbursed to the elderly and disabled and $25.0 billion to the poor (a more detailed breakdown of the programs falling into each category is provided in the notes to Table 5.5). Redistribution of income at this level will have a considerable effect upon the local demand for goods and services. The per capita federal expenditures on welfare and retirement programs by region are shown in Table 5.5.

These redistribution programs have several important effects. First, and most obvious, the purpose of these programs is to redistribute from rich to poor, and to the extent that they have been successful and that regional differentials have narrowed, they have slowed growth in high-income regions and stimulated it in low-income regions.

Second, social security payments have allowed the aged to select where they wish to live during their retirement rather than to rely upon their families. The high per capita retirement payments to Florida ($570) and Arizona ($440) attest to the attraction of the sunbelt to retired people. This has increased local demand for goods and services in these areas.

Third, welfare payments have provided assistance to the poor in both urban and rural areas and increased their demand for goods and services. New York received $181 and Mississippi $158 per capita for welfare programs compared with a nationwide average of only $115. Although the federal contribution to welfare is by far the largest part of public programs for the poor, welfare payments are not uniform nationwide. That may have had a significant effect on interregional and rural-urban migration habits of the poor. Table 5.5 shows the federal and local contributions to welfare payments per poor person for these two regions. In the Middle Atlantic region, local authorities contribute $1149 per poor person, in the South Central only $122. The variation in federal contributions is less, ranging from $1300 to $693 per poor person in these two regions. However, these programs may

[20] A more detailed overview is shown in Tables 6.2 and 6.3 in the next section. Table 6.2 shows the geographic distribution of the effects of federal assistance programs, by agency, on interregional and intraregional economic development. Table 6.3 shows the effects on population, investment, and employment of selected federal programs in central city, suburban, and satellite areas.

Table 5.5

PER CAPITA FEDERAL INCOME TRANSFER PAYMENTS BY REGION, FY1975, AND FEDERAL AND LOCAL WELFARE PAYMENTS, FY1976

Region[a]	Welfare Programs[b] Per Capita FY 1975 (dollars)	Retirement Programs[c] Per Capita FY 1975 (dollars)	Local Spending Per Poor Person FY 1976 (dollars)	Federal Spending Per Poor Person FY 1976 (dollars)	Percent of Population Below Poverty Level, 1975
New England	118	402	1034	1316	8.5
Mid-Atlantic	143	403	1149	1300	10.5
East North Central	101	359	767	1097	8.7
West North Central	83	403	363	672	10.6
South Atlantic	102	426	211	693	13.4
South Central	124	368	122	580	19.3
Mountain	82	385	672	540	12.4
Pacific	132	289	850	951	11.5
Nation	115	392	529	860	12.1

SOURCE: The *National Journal*, June 26, 1976, p. 884, and January 8, 1977, pp. 47, 50. Reprinted by permission of the *National Journal*.

[a]The regional definition corresponds to the census definition of divisions with the exception of the South Central region, which includes both the East and West South Central divisions.

[b]Welfare programs include Medicaid ($7.4 billion total), Aid to Families with Dependent Children ($5.4 billion total), food stamps ($4.5 billion total), supplementary security income for poor persons who are blind or disabled ($4.2 billion total), grants to states for social services programs for their poor residents ($2.0 billion total), and unemployment insurance compensation ($1.5 billion total).

[c]Retirement programs include payments from the social security trust fund to retired persons ($40.9 billion total), to dependents of wage earners who have died ($14.5 billion total), and to disabled persons ($7.5 billion total); payments to retired civilian government employees ($7.1 billion total); payments to retired military personnel ($6.1 billion total); payments to retired railroad personnel ($3.1 billion total); and payments to disabled veterans ($5.7 billion total).

not only serve to help the poor already living in an area but also lead to their increased concentration in central cities of high welfare states. The number of poor households in an area appears to be related to the level of transfer payments, although the evidence is ambiguous.[21] The burden of supporting large welfare populations is reflected in high local taxes, which may hasten the departure of more affluent families and contribute to the secular decline of the Northeast.

Finally, unemployment insurance, welfare payments, and social security programs may have influenced the supply of labor and of loanable funds. These effects are discussed in Sec. VI.

CONCLUSIONS

Federal policies that change the level and distribution of the demand for goods and services have influenced urban economic development. Policies that have favored areas already enjoying a rapid rate of economic development include investment tax credits, countercylical income tax rate changes, and patterns of federal spending. Central cities have benefited from CETA funds and from federal transfer payment programs, although the latter may not only have helped the poor already in central cities but also increased their numbers, which may have an adverse influence on development.

The federal programs examined in this section have reduced regional differences in income through encouraging growth in the South and Southwest. At the same time, these programs may have accentuated the per capita income differential between core areas and their surrounding suburbs.

[21] The effects of federal income redistribution policies on the migration of households is discussed in the *Population and Residential Location* report. The relative concentration of the poor in cities, a result of historical migration and of the search for jobs requiring no skills (Lewis, 1969), has allowed the poor to demand and to get high welfare payments.

VI. THE INFLUENCE OF FEDERAL POLICIES ON THE COST AND AVAILABILITY OF FACTORS OF PRODUCTION

Section V discussed the effects of federal economic policies on the level and distribution of the *demand* for goods and services. This section examines the effects on the production process—the level and distribution of the *supply* of goods and services. The production process is affected through policies on the cost, quality, and availability of the factors of production. The section focuses on four major factors of production: labor, transportation, energy, and capital.

Policies that influence the operation of factor markets may be divided into three categories: tax structure, regulations, and subsidies. Different tax rates and special allowances lead to differences in the relative costs of productive factors. For example, the rate at which capital equipment may be depreciated for tax purposes affects the cost of purchasing and operating capital equipment. Regulations govern the operation of factor markets, either through the price structure or by controlling the way the factor may be used. For example, safety and health regulations set standards for several aspects of the labor working environment, and minimum wage laws define the price at which certain types of labor may be purchased. Subsidies are payments by the federal government from general revenue that alter the price or cost of a factor of production. For example, the Maritime Administration pays part of the costs of maintaining inland waterborne freight routes, which reduces transportation costs. From the perspective of this study, subsidies may also be the public provision of facilities or services that reduce the cost of production to private firms. For example, education facilities constructed with federal grants increase the availability of skilled labor, and industrial parks, developed by local authorities with federal financial assistance, reduce the private cost of constructing a manufacturing plant.

The tax structure, regulations, and subsidies can affect both the relative cost or availability of different factors and the price and availability of a given factor in different locations. Taxes that increase the cost of capital relative to labor encourage businesses to adopt labor-intensive techniques and stimulate the expansion of firms in areas that have large labor supplies. The construction of a highway in, say, Appalachia reduces transportation costs in that area relative to elsewhere and encourages the growth of economic activity.

Little is known concerning the urban or regional effects of the policies and programs discussed here. In some cases, it is possible to hypothesize that there are some effects, and even to identify their direction. However, their magnitude and their relative importance are unknown. The section is, therefore, an exploratory investigation of possible avenues, through which federal policies influence urban economic development.

LABOR MARKET

Through the income tax structure and through transfer payments the government affects the willingness of individuals to participate in the labor force. Manpower and training programs and general support for education—subsidies to users of skilled labor—enhance the quality of the local labor force. The operation of the labor market is controlled through the enforcement of a number of laws regulating wages and working conditions. The federal government acts as a direct employer of labor. Finally, the demand for labor by the business sector itself is affected through taxes and subsidies. These avenues of federal influence are shown schematically in Fig. 6.1, which is drawn from Fig. 2.1.

Tax Structure

Taxes, Transfer Payments, and the Labor Supply. The costs of joining the labor force include forgone leisure time, forgone transfer payments received when not working, and any costs that may be involved in looking for employment. The benefits arise principally from the wages earned while working and unemployment benefits received whi' searching.[1] Individuals take into account not only their own expected income but also that of their spouses. A detailed analysis of the issues and the literature is beyond the scope of this section, but two conclusions do emerge.

The expansion of federal welfare and retirement programs has reduced the labor force participation rate of low income households. Benefit levels for welfare recipients are higher in the Northeast than in the South, which has probably left the South with a more plentiful supply of low-skilled, low-wage workers, even after the migration of some households to the Northeast (see Table 5.5 above). Evidence for this regional difference is provided in a study of a *uniform* nationwide negative income tax (NIT) program (Greenberg and Hosek, 1976), which concluded (p. v) that the reduction in labor force participation would be greatest in the South because of the "geographic distribution of potential NIT participants rather than a propensity on the part of southern families to respond more strongly to a given change in work incentives." However, they found that even a generous NIT program would have a small aggregate effect—a decrease in hours worked by less than 1 percent of the total. Thus, the regional differences have probably been slight. The secular decline in labor force participation rates for all *male* age groups during the last decade probably is attributable in part to welfare and retirement benefits. To the extent that the comparative advantage of central cities depends upon a ready supply of low-income labor, reduced labor force participation rates may have inhibited the growth of employment in cities.

The steady increase in marginal tax rates has caused a decrease in the marginal disposable income and a reduction in hours worked by males as workers substitute leisure for work time, which has encouraged increased labor force participation by wives.[2] However, women have increased participation in the labor force mainly for other reasons, including rising real wages (which has increased the relative cost of

[1] For some relevant analyses of this complex process, see Lippman and McCall (1976) and the symposium presented in the *Journal of Political Economy*, Vol. 84, No. 4, 1976.

[2] This is a product of rising real income, increased tax rates, and inflation, which increases nominal income and reduces the real value of tax allowances.

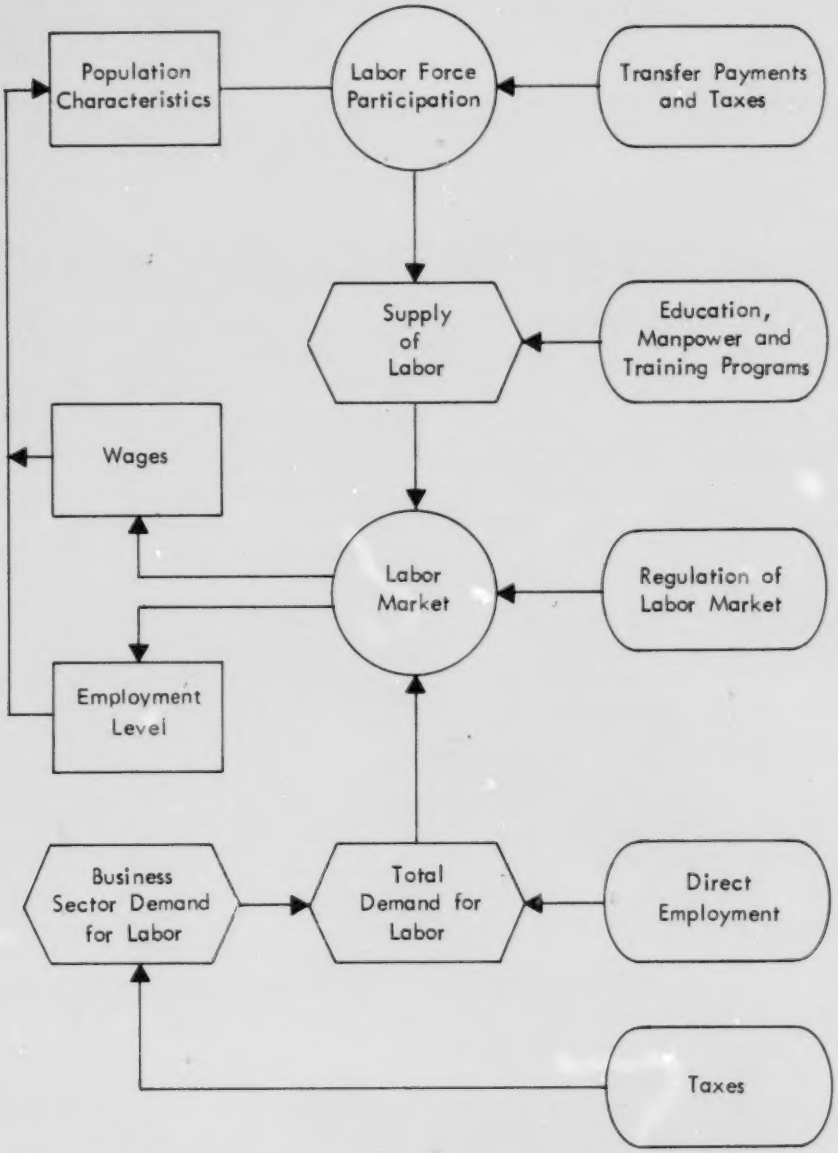


Fig. 6.1—Federal involvement in the operation of the labor market

child rearing).[3] These changes may actually have encouraged the location of households with more than one wage earner in central city areas, since the savings in commuting costs to such a household are substantial.[4]

The Tax Structure and the Demand for Labor. The government taxes the income from different factors at different rates. Corporate income is taxed twice, first through the corporation income tax and then through personal income tax. Labor income is subject only to the latter tax. This may cause corporations to underinvest in capital equipment and to adopt labor-intensive production methods (Harberger, 1962 and 1964). However, the tax treatment of depreciation, which allows equipment and structures to be depreciated for tax reasons more rapidly than they actually wear out, may counteract the effect of double taxation. Whether the complex business tax structure encourages or discourages the use of labor and the extent to which it favors different types of labor skills or different types of locations remains unclear.

Regulation of the Labor Market

The labor market allocates labor among alternative employment opportunities according to the demands of employers and the skills and preferences of employees. The federal government regulates the operation of the labor market. The United States Employment Service provides information to prospective workers on intraregional and interregional employment opportunities, which increases the speed with which the labor market is able to adjust to structural changes in the economy. Unemployment insurance benefits reduce the cost to a worker of quitting one job to search for another or of remaining unemployed. Minimum wage legislation increases the cost of unskilled labor. Through the National Labor Relations Board, the federal government has institutionalized collective bargaining, leading to increased wages. It is difficult to determine whether these policies and regulations have had a distinct urban effect. Employment information centers may have encouraged the migration of rural workers to cities. Their contribution to the movement of labor out of the city or among cities is unclear.

Unemployment Insurance. Unemployment insurance may have exerted a considerable influence on unemployment. Workers who are permanently laid off may spend longer searching for a job than they would in the absence of insurance, which will increase the rate of unemployment. Ehrenberg and Oaxaca (1976) found that unemployment insurance benefits increased the duration of unemployment for all groups in the labor force. In addition, they found that for males and females aged 45 and over, the provision of benefits encouraged the unemployed to seek higher paying jobs. In addition, because the unemployment insurance tax paid by firms is not efficiently tied to the rate of layoffs in that firm, there is an implicit subsidy to firms that frequently lay off workers for short periods of time. Feldstein (1976, p. 956) concludes that this subsidy "has a potentially very large impact on the rate of unemployment, causing layoffs when they would not otherwise happen and

[3] For some evidence, see Feldstein (1976) and Greenberg and Hosek (1976). The latter found, in some regions, that an increase in husbands' wages caused a decrease in hours worked by wives. The labor force participation effect probably operates in the same direction. They found no significant effect of the wife's price of time on the husband's labor supply response.

[4] For a symposium on this complex and controversial topic, see the *Journal of Political Economy*, Vol. 84, No. 4, pt. 2, 1976.

substantially magnifying the size of the layoffs that do occur." It seems likely that the subsidy, and therefore the increase in layoffs, is largest to firms in the consumer durables industries and firms experiencing large fluctuations in demand. This destabilizing influence may have been concentrated in the old manufacturing belt, which experiences volatile employment cycles (see Sec. V). Since layoffs represent more than one-third of the unemployed at any one time, the contribution of the unemployment insurance subsidy to the persistently above average rate of unemployment in the Northeast may be large (Bradshaw and Scholl, 1976).

Regional variations in the level of unemployment benefits may have contributed to interarea migration to some extent. It is possible for workers to move and to continue to draw benefits from their previous workplace. Some workers may return to their home state during "unemployment insurance vacations," leading to a net outflow of funds over time from areas in which a high proportion of the labor force were recent immigrants, since companies would pay insurance premiums but benefits would be disbursed elsewhere.

Minimum Wage Legislation. In 1938, the Fair Labor Standards Act set a minimum wage level. The intent was to alleviate poverty among low-skilled workers. The level has been raised several times, reflecting both the rising cost of living and the desire to improve the lot of low-wage workers. By 1977, the basic minimum was $2.30, which would give a full-time worker $4,774 in a year, considerably below the poverty level for a family of four.

The regulation of the minimum wage at which labor can be hired has been alleged to cause unemployment in those sectors of the economy covered by the regulation, as workers seek jobs paying the new higher wage. (Kosters and Welch, 1972; Mincer, 1975; Gramlich, 1976). This pool of unemployed allows employers to discriminate against certain groups in the labor force, and the unemployment tends to be concentrated among the young and among minorities. In addition, there is a reduction in the level of employment as employers react to the higher wage level, leading workers to seek employment in the uncovered sectors of the economy where the wage rate is driven down. Finally, the reduced employment opportunities may drive a number of discouraged workers out of the labor force. However, there is considerable disagreement concerning the extent of these effects. Many low-wage workers do not feel the effects of the law either because they work in uncovered sectors or because employers do not comply (Ashenfelter and Smith, 1974).

Gramlich (1976) estimated that the law actually raises the wages of about half of all low-wage workers. Only about 10 percent of the labor force falls in this category. The wages of other low-income workers also seem to be affected by the minimum wage, a relationship that he attributes to emulation. In 1974, when the minimum wage was raised from an hourly rate of $1.60 to one of $2.00, he estimated that the total wage bill rose by 0.8 percent, half of which was due to mandatory wage increases and the other half to nonmandatory increases. Teenagers have been especially affected (p. 443): "They appear to be forced out of better jobs, denied full-time work, and paid lower hourly wage rates." Cities contain high concentrations of young people who are poor or members of minority groups and therefore have suffered higher unemployment and the concomitant increased crime and vandalism rates.

Firms may have substituted capital for labor as the cost of unskilled labor was driven up. If so, they may relocate in suburban locations to the extent that land is

a complementary input with capital and, in growth regions, to the extent that energy is a complementary input. The effect is unlikely to be very extensive.

Unionization. The National Labor Relations Board has influenced the organization of unions and the structure of negotiations between employers and employees. Unionization has led to increased wages for organized labor (see Table 4.6 above). The rate of unionization differs significantly among regions. There is little empirical evidence that a high rate of unionization has led to slow employment growth (Wheat, 1973). Schmidt and Strauss (1976) found that although the level of earnings by union members had a positive and significant influence on union membership, the degree to which a work force was unionized had no significant influence on earnings. They concluded that high wage earners may tend to unionize rather than unions to attain high wages.

Occupational Safety and Health Administration (OSHA). In 1970 OSHA was established to regulate environmental conditions inside workplaces. Regulations are still being promulgated, particularly in the areas of safety, noise, and air quality. Regulations may be specific to industry, working area, substance, and equipment.

In the short run, costs of production may rise substantially because compliance with these regulations may require substantial capital investment. Bosworth (1976) estimated that OSHA regulations raised the capital cost of paperboard production by only 1 percent, although other industries may be more severely affected. In the longer run, innovation will occur that allows the development of new machinery, the substitution of new materials, and improved plant, reducing the costs of complying with these regulations. Plants will become obsolescent more rapidly, and the construction of new facilities will be encouraged. To the extent that firms relocate when they are contemplating building new facilities, OSHA regulations may speed up the process, although they may not influence the final level of interregional-intraregional relocation. To the extent that compliance is easier in new rather than older plants, the regulations may work against the old manufacturing belt. Sufficient data are not available to be able to predict which industries will be most severely affected.

Manpower Development and Training Schemes[5]

During the 1960s, the persistent unemployment and poverty in a number of depressed areas and in inner cities led to the development of a comprehensive national manpower policy, expressed in the Manpower Development and Training Act of 1962 (MDTA). Since then a number of programs aimed at providing jobs, job training, information, and counseling have been developed. The MDTA has been largely replaced by the Comprehensive Employment and Training Act of 1973, which decentralized the control of manpower funds and operates primarily through local governments.

Manpower programs may be classified according to the way they affect the operation of the labor market. There are four categories. First, there are skill training programs, developed under MDTA, which provide both institutional and on-the-job training. For the latter, the employer pays the wages but all training

[5] This section is based upon the extensive review of manpower programs conducted by Perry et al. (1975).

costs are met from public funds. Second, there are programs designed to provide jobs for the disadvantaged and poor, including the JOBS (Job Opportunities in the Business Sector) program, created in 1968, a joint effort of the federal government and private sector employers to hire, train, and retrain seriously disadvantaged workers through counseling and information dissemination; and the Public Employment Program (PEP), created in 1971, which provides funds to state and local governments to hire the unemployed in transitional public service jobs. Third, there are employability development programs, including the Concentrated Employment Program (CEP) focused upon urban poverty areas to coordinate the delivery of manpower services; and the Work Incentive Program (WIN), which provides remedial education, vocational training, placement, and followup services to employable AFDC recipients. Finally, a number of work experience programs, including the Neighborhood Youth Corps (NYC), created in 1964, are designed to keep young people in school, get them back to school, or increase their chance of becoming employable.

These programs are likely to have affected the participants, the local labor market, and the quality of local public service delivery, itself a factor affecting industrial development. Summarizing the results of a number of evaluative studies, Perry et al (1975) concluded that the increase in the earnings of participants may be of the following order of magnitude:

1. Skill Training—$400 to $800 per year.
2. Job Development—$300 to $700 per year.
3. Employability Development—$200 to $400 per year.
4. Work Experience—$0 to $200 per year.

These programs have been concentrated in urban areas, and some have been focused on central city areas in which there are substantial pockets of disadvantaged and minority workers. The findings that participants tend to increase earnings and reduce the frequency of unemployment suggest that the primary contribution of manpower programs has been to facilitate entry into the labor force of disadvantaged workers, thus enhancing the comparative advantage of central city areas with respect to their supply of unskilled and low-skilled workers. This pool of labor remains an important asset of central cities. However, providing public sector employment opportunities to a large number of low-skill workers reduces their availability to the private sector. Although this has little effect during recessions, if the workers cannot easily be returned to the private sector during the subsequent economic recovery, then there may be a tendency to drive up wages (Barth, 1971).

There is no evidence concerning the effect of public service employees on the quality of local public services. CETA was passed on the assumption that there was a substantial demand for local public services not being met because of fiscal pressures. It is unclear whether CETA participants have been able to provide these services. Large cities and counties with large populations have received substantially more CETA funds than small towns. Therefore, they may have been able to upgrade their labor forces more effectively than cities receiving smaller allocations and thus save welfare payments.

TRANSPORTATION

The federal role in the development of the national transportation network has been extensive. Railroads were encouraged during the 19th century through massive land grants, waterways were constructed through direct federal ownership and investment, the interstate highway system has been built largely from federal grants to states, and air transportation has been facilitated through the federal administration of air terminals and navigation systems. In addition, the transportation industry has been subject to extensive regulation through a number of agencies.

From the perspective of industrial development, transportation of freight is of primary interest. However, urban passenger services are also important since they determine the ease with which workers may reach their place of work, affecting patterns of residential and employment location. The principal federal influences on transportation are felt through regulation and subsidies and not through the structure of the tax system.

Regulation[6]

The transportation sector is one of the most heavily regulated in the United States.[7] To the extent that regulation leads to higher freight costs per mile on all modes, business will tend to decentralize. Companies with a high level of raw materials inputs will move closer to their sources, and market-oriented companies will follow population shifts more closely. The importance of changing patterns of population distribution in causing changes in the distribution of employment is therefore increased. Further, to the extent that regulation affects the relative costs of alternative transportation modes, the comparative advantages of different types of locations and different regions are altered. For example, if the cost of truck transportation is reduced relative to rail transportation, then the comparative advantage of a location near a suburban highway interchange is enhanced, and that of a central city location next to a rail spur is reduced.

Federal regulation of freight transportation is achieved principally by the Interstate Commerce Commission (ICC) for surface transportation and the Civil Aeronautics Board (CAB) for air transportation. Regulations define the rates at which types of freight may be hauled by common carriers, the conditions under which freight may be carried, and the conditions for entry of new common carriers. Most federal regulations apply only to carriers who cross state lines and who provide freight services to a number of companies. Private freight companies, owned and operated by individual companies for carrying their own inputs and outputs, are not subject to regulation.[8] This has led to a sharp decline in the share of haulage carried by common rather than private carriers (Wilson, 1970). Many central city firms are too small to operate their own private hauling system and therefore must rely on common carriers. Therefore, by penalizing common carriers, the ICC may have raised the costs of operation of small, new companies in the

[6] This section is based on the excellent summary article by Johnson and Harper (1975).

[7] Railroads were the first carriers to be regulated in 1887. They were followed by oil pipelines (1906), highway carriers (1935), airlines (1938), and domestic water carriers (1940).

[8] Only one-third of all motor-ton miles traveled by truckers are by common carriers and subject to regulation, and 10 percent of all companies spending $5 million or more for transportation engage in private carriage (G. Stern, 1975, p. 85).

central city areas relative to the costs of large companies with their own truck fleets. This effect may be negated somewhat because these small manufacturers have been protected by tariff rates that have favored small load shippers.

Freight Rates. Average freight rates may be increased through regulation in a number of ways: Regulated rates may be set above the competitive level; rate setting may encourage transfers of freight between modes, increasing average costs of transportation; and regulation may encourage the adoption of inefficient techniques of production that raise costs and may deter the introduction of innovations. The extent to which ICC regulations have led to increased freight costs is a hotly debated topic. Most of the increased freight cost resulting from ICC regulation is attributed to the excess capacity in the railroads and trucking businesses. Idle railroad plants and equipment may raise total costs by between $2.4 and $3.8 billion per year, and the cost of misallocation between trucking and railroads may cost between $300 million and $2 billion (Moore, 1971). The Department of Transportation[9] concluded that:

> The current regulatory structure severely limits the scope of individual carrier initiative in rate setting. This has produced a rate structure unrelated to the costs of the most efficient carriers, with consequent misallocation of resources in transportation. There are two important manifestations of the inefficiency produced by current rate regulation. First, regulation reduces competition among carriers and modes. As a result many rates have been held above the costs (including reasonable return on investment) of the most efficient carriers. This causes shippers and ultimate consumers to pay more than is required for transportation services, and prevents traffic from flowing to the most efficient carriers. It appears that these high freight rates raise shipper costs by about $2 billion per year.

In discussing deregulation proposals, Roberts (1959, p. 579) stated, "Overall prices will generally be lower than under the present pattern, but certainly not at levels that could be considered 'ruinous.'" Some observers have actually estimated the magnitude of transportation cost reductions if transportation were deregulated. Sloss (1970, p. 351) calculated that deregulation of the highway carrier industry would reduce the truck bill by approximately $350 million per year out of a total of $15 billion, or 2.3 percent. Williams and Bluestone (1960, p. 5) have stated that "the annual transport bill would be reduced by several billions of dollars on freight alone." The Council of Economic Advisers (1972, p. 135) reported that the Transportation Regulatory Modernization Act of 1971 was expected to yield an annual savings of approximately $2 billion. Moore (1971) conservatively estimates that the total cost of regulation is around $5 billion, or more than 10 percent of total freight transportation operating revenues.

A major source of these increased costs is argued to result from the excess capacity of transportation facilities. Meyer et al. (1960) calculated that only about 50 percent of the physical capacity of the trucking industry is used. As Hilton (1973, p. 711) argues, the regulations that restrict the extent to which private carriers can backhaul common freight "clutters the road with movements of empty trucks, which is both a waste of transportation facilities and a source of unnecessary traffic congestion." Hilton also noted that railroad cars average less than three hours of movement a day.

[9] U.S. Department of Transportation, *Traffic World*, 1971, p. 12.

Against these diverse findings, proponents of regulation argue that many of the costs are overestimated and that wasteful competition would result from deregulation (G. Stern, 1975). Johnson and Harper (1975) conclude that the majority of the evidence supports the view that regulation has led to increased freight rates and that harmful competition would not result from deregulation. Regulation has therefore encouraged decentralization of employment through increasing average transportation costs.

Route Discrimination. Supporters of regulation have argued that rate control is necessary to preserve services to small towns (Shinn, 1964) and to shippers of undesirable traffic such as small loads and furniture (Barrett, 1971). Friedlaender (1969), an opponent of regulation, acknowledges that rural users and those requiring small loads have been implicitly subsidized. In the absence of regulation they would face higher rates and reduced services. There has therefore been an implicit cross-subsidy from firms located in large cities to those located in less densely populated areas. Intensively used railroad networks in the old manufacturing belt have probably been forced to price their services above the unregulated rate, whereas areas with a less intensive use of rail services have faced rates below the unregulated level. In the absence of railroad regulation, the service to many small towns, and even to many central city spurs, would be abandoned and many types of freight service terminated. Hilton (1973) estimates that as much as 35 percent of the existing track would be abandoned. There has therefore been an interregional subsidy from areas with a high concentration of employment to less developed areas, which has encouraged decentralization of employment. The CAB has also regulated entry and route allocation for air freight and passenger fares in such a way as to favor small communities at the expense of large cities and has therefore favored decentralization (Eads, in Phillips, 1975). However, less than 3 percent of all freight is carried by air.

Route discrimination has probably contributed to employment growth in outlying suburban and nonmetropolitan areas. A number of truck routes would be abandoned if rates and routes were deregulated. There has also been a subsidy from shippers of large bulk freight to small-load shippers, which may have favored central cities having a concentration of small companies.

Intermodal Effects of Regulation. A major effect of regulation has been the growth of trucking at the expense of railroads. Railroad revenues have been eroded and costs per unit of freight handled have risen (Nelson, 1970). In 1940, railroads carried 68 percent of the total volume of freight (excluding pipelines) while trucks carried only 10 percent. By 1970, the shares were 51 percent for trucks and 27 percent for railroads. The increase in trucking has stimulated the suburbanization of employment as plants seek sites with highway access, and some plants have moved toward regions served only by highways. Firms using rail spurs in central cities have faced high prices and poor quality in their rail freight services.

In the absence of regulation, railroad costs in some areas are likely to decline because of intermodal "umbrella" pricing policies followed by the ICC (Arpaia, 1970; Williams, 1958). These pricing policies prevent one mode from competing with others in their rates for different types of freight. Peck (1965) estimated that railroads could recapture up to 10 percent of both highway and waterborne freight if rates were deregulated.[10] The diversion from trucking would provide an indirect

[10] Friedlaender (1969) estimated the potential diversion at 65 percent. Hilton (1973) concludes that this figure is probably too high and is not consistent with the limited deregulation begun in 1958.

benefit of reduced traffic congestion, especially in the Northeast. However, much of the congestion in these cities results from intracity freight movement. An expansion of rail at the expense of trucking would not affect this. Railroads would gain a great deal of the market for freight that is shipped more than 200 miles (Friedlaender, 1969). This gain might reduce the tendency for industry to follow population in growth regions, since the cost of shipping from sites in the old manufacturing belt would be reduced.

Regulation and Innovation. Since the regulation of freight rates is tied to costs, it discourages the introduction of new techniques (Gellman, in Capron, 1973; Gellman, 1974; Nelson, 1970). Rates of return on capital often provide a guideline for costs, so there is even less incentive to introduce capital saving techniques; that would reduce the profit per dollar of receipts that a company could earn. Gellman (in Capron, 1973, p. 217) explains that there are also financial disincentives to innovation, citing the following example:

> While a freight car is being operated by a railroad other than its owner, a per diem rental charge is paid to the owner. Unfortunately, the basis on which the [regulated] per diem charges are determined does not sufficiently reward the upgrading of equipment. Indeed, until recently, per diem charges did not reflect differences in the age and condition of cars.

The behavior of the ICC itself may also serve to delay innovation. The introduction of "Big John" freight cars was delayed several years by ICC deliberations (Hilton, 1973).

Subsidies and Public Construction of Facilities[11]

In 1974, total private and public spending on transportation was $295.7 billion. Federal transportation programs accounted for $11.3 billion, or nearly 4 percent, while state and local governments spent $22.8 billion, or 7.7 percent (U.S. General Accounting Office, 1975). The federal government provides funds to states and cities for the construction of highways, roads, rail lines, and subways. Money is also provided for the purchase of capital equipment and to pay for system operating costs. These subsidies influence the price, quality, and availability of transportation services. They may reduce the average cost of services to users. Further, if the level of subsidy differs among modes, freight traffic may shift among modes. For example, waterborne transportation receives a much higher subsidy than rail, which implies that its price has been reduced relative to rail. Subsidizing one aspect of the costs of transportation provides an incentive to change the way in which the service is provided. For example, because the purchase of capital equipment for mass transit systems is subsidized, local governments face an incentive to ignore capital saving innovations for the improvement of services.[12] Finally, the provisions under which subsidies are granted may affect the behavior of the transportation mode.

Inland Waterways. Waterborne freight is the most heavily subsidized method of transportation. The Corps of Engineers spent $606 million in FY 1976 on

[11] The data presented in this section are from a study by the Congressional Budget Office (1977) except where indicated.

[12] For a discussion of this problem with reference to subway improvements, see Vickrey (1974) and Boyd (1973).

inland waterway construction and operation, most of it on the Mississippi River and the Great Lakes. The primary beneficiaries of recent waterway construction have been states in the South—for example, the Houston Ship Canal and the McClellan-Kerr Arkansas River Project. These projects may have a large influence on local industrial development. Rose (1967) estimated that the Houston Ship Canal was directly responsible for the creation of nearly 27,000 permanent jobs and indirectly responsible for a further 30,000 jobs in 1963, nearly 10 percent of Houston's total employment in that year.[13]

Mass Transit. The availability of public transportation services may be an important factor to business. Not only do mass transit services affect the ease with which workers can travel to their workplace, but by diverting traffic from the private automobile, road congestion is reduced. In most urban areas, revenue from mass transit companies covers less than 50 percent of operating expenses (Urban Mass Transit Authority, 1976). If federal rather than local funds are available to subsidize operating costs, then local tax rates may be reduced.

The Urban Mass Transit Authority (UMTA) subsidizes the construction costs of mass transit facilities and some of the operating costs. Under the Section 5 program, a given level of funds was allocated to urban areas of different sizes for FY 1975 and 1976. For example, $515 million was allocated for 25 urban areas whose population exceeded 1 million, $89 million for 22 areas whose population was between 500,000 and 1 million, and so on. Although the funds could be used for either operating or capital costs, more than 90 percent has been spent to meet operating costs. The formula currently used to allocate Section 5 funds distributes half in proportion to urban area population and half in proportion to population weighted by density. There are considerable variations among groups of urban areas in the extent of the operating subsidy, as the data presented in Table 6.1 show. Smaller urbanized areas tend to receive a much larger subsidy per unit of service than larger areas.

Highways. Federal involvement in the construction of highways has been enormous. More than $60 billion has been spent on the development of the interstate highway system since World War II. However, the degree of federal subsidy is much less than this since the construction has been financed from the Highway Trust Fund, which receives the revenues from the excise taxes on gasoline, tires, oil, and the sale of commercial vehicles. Receipts have generally exceeded disbursements. Between 1950 and 1972, total disbursements to states were only $58 billion, while payments into the Highway Trust fund exceeded $66 billion. In FY 1974 and FY 1975, revenues exceeded disbursements by $604 million and $247 million. By FY 1976 this had been reversed, largely because of the release of funds impounded during the Nixon Administration, and expenditures exceeded revenues by $2.3 billion.

Federal expenditures on the highway system represent only a small part of the costs of road transportation. Road users, both freight and passenger, spent $220 billion in 1974, a year in which there was a negative federal subsidy and a state and local subsidy of $7.1 billion. Even under the most generous assumptions, the total public sector subsidy is no more than 3 to 4 percent of costs. Highway and

[13] The Houston Ship Channel is 50 miles long and was completed in 1914. It was widened to 40 feet during the 1960s, at a public cost of $126 million, accompanied by private investments of $2.5 billion. Houston now ranks third in the nation as a deep-sea port.

Table 6.1

ALLOCATION OF SECTION 5 FUNDS PER RIDER AND PASSENGER MILE, BY SIZE OF URBAN AREA

Urban Area Population[a]	Allocations of Section 5 Funds for FY 1975 and FY 1976 (dollars)	
	Per Revenue Rider	Per Passenger Mile
1 million +	0.06	0.18
500,000 to 1 million	0.15	0.34
200,000 to 500,000	0.16	0.36
50,000 to 200,000	0.25[b]	0.43[b]

SOURCE: UMTA, *Transit Operating Performance and the Impact of the Section 5 Program*, U.S. Department of Transportation, Washington, D.C., November 1976, pp. 33-34.

[a]Based upon a sample of urban areas within each size class receiving funds.

[b]Since allocations are not made directly to urban areas with populations less than 200,000, these shares are derived by applying factor weights to the governors' apportionments.

railroad freight transportation receive public subsidies, at present, at about the same rate.

The extent of the federal subsidy to highway freight is not uniform across or even within regions. There is a positive subsidy per vehicle mile in areas where roads are less intensively used. Thus, the federal highway system has probably provided a substantial subsidy to road freight shippers located in the South and Mountain regions, and in nonmetropolitan regions—a subsidy that is financed by the users of the densely used highways in the Northeast. For example, for each dollar that the state paid into the Highway Trust fund between 1957 and 1972, Idaho received $1.83 in apportionments, Louisiana $1.21, Montana $2.44, Nevada $1.98, New Mexico $1.52, and Wyoming $2.71. By contrast, Massachusetts and Michigan received only 77 cents for each dollar they contributed, New Jersey 66 cents, New York 80 cents, and Pennsylvania 79 cents. The way in which highways have been financed has therefore led to an interregional transfer that has not favored the Northeast.

Even though there has been no net public subsidy, without the commitment of the federal government, many highways would not have been constructed. The Northeast region had developed an extensive system of turnpikes without federal funds. The Southern and Mountain states would not have been able to afford their own highways, and the attractiveness of these regions as industrial locations would have been substantially affected. The Highway Trust Fund, with its ability to raise revenues from a variety of sources and to redistribute resources among regions—functions that no other institution, public or private, could have performed—may have played a larger role in shaping regional growth patterns than any other federal policy or program.

Rail. The financial collapse of the Penn-Central Railroad in 1974 spurred a sharp increase in federal assistance to both passenger and freight rail services in

the form of direct budgeted subsidies and low interest loans. The latter will become subsidies if the loans are forgiven in the future, a probable development in the case of some AMTRAK loans. For example, in FY 1976 United States Rail Association loans issued in previous years were forgiven.

Including guaranteed loans, federal subsidies for rail freight rose from $84 million in FY 1974 to $952 million in FY 1976, the latter figure representing about 4 percent of expenditures (Congressional Budget Office, 1977). Subsidies for passenger transportation rose from $289 million in FY 1974 to $607.5 million in FY 1976, more than 75 percent of total rail passenger expenditures.

It is too early to assess the effects on regions and cities of the Rail Services Act of 1973, with its commitment to CONRAIL and AMTRAK and its massive funds for modernization of equipment and facilities. To the extent that the quality of service is improved and subsidized prices are maintained at a low level, central cities and the Northeast as a whole might be expected to benefit, since cities have more existing rail spurs in industrial land than other areas.

Air. The federal government spent $2.47 billion in FY 1974 on air freight and passenger transportation, or 13 percent of total expenditures (U.S. General Accounting Office, 1975). Less than half of this may be considered a direct subsidy. Much of the difference is the revenues of the Airport and Airway Trust Fund collected from airport user taxes. Between 1971 and 1975, the fund collected $5.5 billion in revenues and spent only $3.5 billion. Some of this subsidy is for international air transportation. Among the services provided under this subsidy are the construction and operation of airport facilities, operating subsidies to air carriers, and aviation weather services. Although there are no more disaggregated data that would allow for an assessment of the urban effects of these subsidies, they have very likely operated in the same way as the highway program—subsidizing small towns and growth regions at the expense of larger cities and the Northeast—but on a much smaller scale, reflecting the small role of air transportation.

ENERGY

Past energy policies have considerably influenced the price and availability of energy. Future energy policies, aimed at increasing domestic production, reducing oil imports, developing new sources, and encouraging conservation, may have even more far reaching effects.

Tax Structure[14]

Depletion Allowances. Although most industries are allowed to deduct from gross income capital assets that are used up in production (depreciation), producers of natural resources are also allowed to treat part of their income as tax-exempt, even if it far exceeds the costs of capital assets being used up (depletion). Brannon (1974) estimated that this allowance has been most important for oil and natural gas. He considered a case under which all the savings from depletion allowances were passed along to consumers in the form of price reduction and estimated the percentage reduction in fuel cost for electricity generated from each fuel. His

[14] This section draws upon a comprehensive review by Brannon (1974).

estimates were: oil, 13.2 percent; natural gas, 11.5 percent; coal, 3.4 percent; gas from coal, 1.4 percent; uranium, 2.8 percent; oil from shale, 4.5 percent.

These special allowances, by encouraging domestic production, have favored regions with endowments of oil or gas—principally Texas, Louisiana, and Oklahoma. They have also favored industries using those fuels.

Utility Tax Exemption. Publicly owned power utilities are exempt from income tax and are allowed to issue tax-exempt municipal bonds. Brannon estimates that these two differentials may lower the cost of electricity to consumers by as much as 20 percent. To the extent that suburban and nonmetropolitan homes are more energy-intensive than central city homes, this reduction in electricity cost may have offered a slight inducement to suburbanization.

Regulation

The regulation of energy production and distribution takes several forms; prices of domestically produced oil and natural gas shipped across state lines are regulated by the Interstate Commerce Commission and the Federal Power Commission (FPC); imported oil was subject, until recently, to quotas and to import fees; and power utilities are subject to regulation by the FPC, the Atomic Energy Commission (AEC), and the Federal Energy Administration (FEA).

Natural Gas.[15] The FPC, under powers granted by the Natural Gas Act of 1938 regulates the price of gas shipped by pipeline out of the producing states. The regulated rate is considerably below the market rate. The price of natural gas in Texas, which is not subject to regulation, is double the interstate regulated price. Jones et al. (1975, p. 1) describes the results of this regulation:

> Constraints on gas supply, brought about by price regulation, have discouraged any expansion in regional gas consumption, however, and the Northeast has experienced extensive curtailment of industrial and commercial gas customers. Many of the curtailed users have been forced to turn to oil.

Even at the unregulated price, natural gas is a cheap source of process energy for many industries. The Northeast and Midwest have therefore been at a disadvantage, since new industrial linkups are impossible, and continued service on existing links is by no means assured. Curtailment of service to certain types of users is determined by the FPC, which has favored residential users at the expense of industrial users. The FEA (1975) estimated that energy costs in New England were three times as high as in the West South Central area. A number of industries in high cost areas undoubtedly suffered because of regional differences in natural gas availability. Industries have been attracted to gas producing regions where supplies are readily available.

Oil.[16] Federal regulation of oil has had little effect on its price. Price controls are not binding, although the import fee of 1.5 cents per gallon on refined products has increased its price (Phelps and Smith, 1977). Areas that rely heavily upon imported oil, and upon oil rather than natural gas, have suffered relative to other areas.

[15] For an analysis of the effects of regulation and curtailment, see MacAvoy and Pindyck (1975).

[16] The role of federal taxes and regulations on the oil industry is both complex and controversial. Even a cursory treatment is beyond the scope of this report.

The oil entitlements program, under which domestic refiners receive compensation for each barrel of foreign oil—more expensive than domestic oil—has led to increased imports of crude oil and reduced imports of refined products (Chapel, 1976). Areas in which petroleum products are refined have therefore experienced a lower level of employment than they would otherwise have enjoyed. Prices of refined products may have been reduced a little.

Utility Regulation. Utility companies, particularly the electric power generating industry, are regulated in a number of ways. Rates and promotional activities are regulated. The entry of new companies, mergers between existing companies, and financing additional capacity are all regulated. In addition, utilities are subject to environmental and safety standards.

The regulation of utility companies may have had a number of effects. First, regulation may have encouraged the development of capital-using, large-scale generating plants (Hughes, in Capron, 1971). Research and development have been almost entirely federally funded. The industry itself has undertaken very little research on its own. Second, regulation may have prevented many small utility systems from combining to enjoy economies of scale. Rates in small, low density areas are somewhat higher than they would have been if mergers were allowed. However, it is difficult to discern any specific urban or regional effect. The increased concern with potential environmental impacts has led to a dramatic slowdown in the construction and development of nuclear power stations, which has curtailed the expansion of capacity.

Subsidies

The Energy Research and Development Administration (ERDA) is programmed to spend $2.7 billion in FY 1977 to subsidize the research and development of new sources of power, improved methods of power generation, and new methods of energy conservation. This expenditure will stimulate regions with rich endowments of coal, oil, and gas, and areas that produce machinery and equipment for mining and for nuclear power plants. There is no evidence on the likely distribution of the urban effects of this program.

Another energy related subsidy is in the form of loans to Rural Electric Cooperatives at 2 percent, instead of a rate of 6 percent from nonfederal sources. In 1976, with loans of $5 billion outstanding, this was an annual subsidy of $200 million. It may have aided a little in the expansion of industry in nonmetropolitan areas.

Finally, the federal government has constructed and operates a number of hydroelectric power plants, which control rates in the areas they serve. Hydroelectric power has been most important in the Mountain region, in the Pacific Northwest, and in the South Central region served by the Tennessee Valley Authority. These areas enjoy low cost electricity and have attracted a number of industries (e.g., aluminum smelting) that are intensive users of electricity.

CAPITAL

Capital is defined here to refer to all land, plant, and equipment used in the process of production. Approximately 10 cents of every dollar of value added is attributable to allowance for capital consumption compared with 66 cents for wages

and 16 cents for direct and indirect business taxes (Council of Economic Advisors, 1976). The remaining 8 cents represents profits and interest payments. The rate of interest at which businesses may borrow funds is affected by the tax structure and by federal monetary and fiscal policies. The tax structure and a number of federal regulations affect the private cost of purchasing and using capital equipment. Federally subsidized loan programs offer loans to certain types of businesses for specified purposes. The public sector also constructs part of the infrastructure, which reduces the cost to a private firm of constructing a productive facility.

Tax Structure

The rate of interest at which investment funds are available has been raised through a number of federal policies. The corporate income tax and the personal income tax raise the real interest rate, which may have led to the adoption of labor-intensive techniques—an effect that may encourage firms to seek an urban location because of the availability of labor—and also to a flow of investment funds out of the corporate into the noncorporate sector (Harberger, 1962 and 1964). However, for the purpose of computing taxable income the tax system allows businesses to depreciate capital equipment more rapidly than the equipment physically depreciates. This reduces the cost of capital and may compensate somewhat for the effects of the corporate income tax.

Social Security payments may have contributed to a decline in the availability of funds, driving up the real rate of interest and reducing investment. Studies by Feldstein (1974) and Munnell (1974) have found that households reduce their saving in response to these guaranteed benefits. However, the declining labor force activity of the aged since the introduction of the system has encouraged households to save in anticipation of involuntary retirement, which has weakened the depressant effect of guaranteed retirement benefits. Since the social security system is not funded but operates on a pay-as-you-go basis, the reduction in personal saving is not offset by an increase in public saving. Feldstein estimates the reduction in the private capital stock might be as much as 38 percent, resulting, perhaps, in a reduction of annual income by as much as 15 percent and a real rate of interest nearly one-third above its equilibrium level. These effects are of sufficient magnitude to merit further research.

The rate differential between capital gains and corporate income taxes causes another effect. The lower incidence of capital gains taxes has encouraged firms to purchase large sites and sell portions as demand rises.[17] Purchase price can be offset against corporate income taxes, while capital gains taxes, rather than corporate income taxes, are paid on the profit from sales. Earnings from the sale of real estate held for personal use or business-related purposes can qualify as a long-term capital gain where the property sold was not held primarily for sale to a customer in the ordinary course of business and was held for more than six months. Capital gains are effectively taxed at only one-half the rate of ordinary corporate income tax.

Land on the urban fringe normally appreciates at a much faster rate than that within the inner city and older suburban areas. Capital gains tax provisions, which

[17] This section is based upon a statement by Congressman Norman Y. Mineta before the Housing Subcommittee of the House Banking and Currency Committee, September 5, 1975.

shelter rapid appreciation from tax, often encourage investment and speculation in fringe area land markets while discouraging the retention of such land for agricultural purposes.

Fulton (1971, p. 10) illustrates this process with the case of a company that

> 10 years ago acquired a very large site on Route 128 near Boston. Before the company could complete its plans for construction on the new site, it received—and accepted—an offer for a small portion of the property at what constituted a substantial profit.
>
> This was the first of many such transactions, all with increasing profitability, to the point where the company was realizing greater profits in land sales than in manufacturing.
>
> As a result, when another division of the same company planned expansion in the Chicago area, the company insisted on the acquisition of 100 acres even though the utmost requirement for the proposed facility was only 10 acres.

This aspect of the tax structure encourages suburbanization, although there is no evidence concerning the magnitude of its effect. The extent to which relocation is necessary to enjoy the benefits of land speculation is unclear.

Regulation

A number of federal regulations have affected the cost and availability of capital equipment. Pollution controls (discussed below) and OSHA regulations (discussed above) result in more expensive capital equipment.

Regulation of Financial Institutions. The heavy regulation of banks and nonbank financial intermediaries has had extensive and far-reaching effects on the operation of the capital market and the availability of loanable funds. The situation is complicated by the wide variation in regulatory procedures at the state level.

The interest rate restrictions are perhaps the most important. No interest is allowed on demand deposits, and there are limits on the interest rates that can be charged for loans on savings accounts. This creates a sharp movement between different types of short-term assets as the interest rate approaches the legal limit. For example, if the short-term interest rate rises above the rate offered by thrift institutions or the rate that can be charged for mortgages, these financial institutions experience a withdrawal of funds and are forced to cut back on mortgage loans, contributing to the volatility of construction-sector employment. This effect may slow down the movement of population toward suburban areas and growth regions.

Regulation also restricts entry into the banking business, which has encouraged bankers to assemble low-risk portfolios of loans (Gardner, 1973). The central city is an incubator of emerging companies, which rely heavily on local bank loans as a source of finance. This risk-avoiding behavior has probably reduced the supply of small business loans. Restricted entry into the banking field may, therefore, have hampered economic development in central cities.

Subsidies and the Public Provision of Capital Infrastructure

The costs of capital and of facility construction are subsidized both through the provision of low interest loans and through the public construction facilities neces-

sary for a factory—roads, water treatment plants, and physical structures. These actions may be regarded as capital subsidies because they reduce the capital costs of a plant to a private businessman.

The Small Business Administration (SBA) advances low interest loans to small businesses ($400 million in 1976) with emphasis on minority owned businesses; nearly 27,000 minority businesses received $50 million of assistance in 1976. By the end of that year, there were nearly $6 billion of SBA guaranteed loans outstanding. In 1976, the federal government budgeted for direct loan commitments and loan guarantees of $51 billion. The major component was for housing—$3.5 billion through Farmers Home Administration, $7.5 billion through the Federal National Mortgage Association, and $17.5 billion for low rent public housing and FHA loans. Economic development loans are therefore small fractions of federal loans, and the implicit subsidy is small. It has been estimated that the present value of all federal loan subsidies in 1976 was only $3.8 billion, less than 0.1 percent of which was for economic development (Budget of the United States Government, FY 1976). Since there is a concentration of new small businesses in central cities, cities have benefited from development loan guarantees. This benefit has probably been more than offset by housing loan guarantees, which have stimulated the suburbanization of middle and upper income households. Federal assistance is also available for the construction of capital infrastructure facilities. These programs have exerted a much greater influence than have interest subsidies. Table 6.2 summarizes the interregional and intraregional effects of a number of federal assistance programs. Table 6.3 describes the effects of selected programs on the level of population, investment, and employment in central cities, suburban areas, and nonmetropolitan (satellite) areas. The highway construction program stands out. There is also a discernible bias in favor of suburban development at the expense of central cities; five of the programs listed in Table 6.3 had a moderate or heavy effect on noncentral city areas, only three had a similar effect on central city employment. Since a comparable volume of funds is not available for maintenance and operation of public facilities, these programs represent a subsidy for growth. Areas in which infrastructure is already in place receive few funds, while growing areas that are undertaking a considerable volume of construction receive extensive subsidies. The pattern of publicly funded construction has probably stimulated development in suburban areas, nonmetropolitan areas, and growth regions.

OTHER AVENUES OF FEDERAL INFLUENCE

In addition to the four major productive factors discussed in the preceding sections, there are a number of other areas of federal effects, but they are difficult to quantify.

Pollution Control

Environmental protection legislation has forced firms to modify their equipment to reduce noise, water, and air pollution, thereby increasing operating costs. These regulations affect industries differently. Pollution abatement will raise capital and operating expenses, which will increase the cost of production of steel by 2.8 percent, aluminum by 2.1 percent, and paper and paperboard by 4.2 percent

Table 6.2

GEOGRAPHIC EFFECTS OF FEDERAL ASSISTANCE PROGRAMS[a]

Program	Interregional	Intraregional		Metropolitan		
		Metropolitan	Nonmetropolitan	Central City	Suburb	Satellite
Department of Agriculture						
Rural electrification loans	Very slight	None	Moderate	None	None	None
Waste and water disposal systems for rural communities	Very slight	None	Very slight	None	None	None
Department of Commerce						
Industrial development loans	Very slight	None	Slight	Very slight	None	None
Public works and development facilities program	None	Slight	Slight	Slight	None	None
Technical assistance	None	Very slight	Very slight	Very slight	Possible	None
Department of Health, Education and Welfare						
Child development, Headstart	None	Possible	Possible	Possible	None	None
Construction of public community colleges and technical institutions	Very slight	Very slight	Possible	None	Very slight	Very slight
Health facilities construction	None	Very slight	Possible	Very slight	Slight	Possible
Department of Housing and Urban Development						
Basic water and sewer facilities, grants	Very slight	Slight	Very slight	None	Moderate	Moderate
Comprehensive planning assistance, grants	None	Very slight	None	None	Very slight	Very slight
Homeownership for lower income families, mortgage subsidies	Very slight	Very slight	None	Slight	Slight	Very slight
Interest reduction payments	Very slight	Slight	None	Slight	Moderate	Slight
Land development and new communities	None	Possible	None	None	Possible	Possible
Mortgage insurance 1-4 family homes	Very slight	Moderate	Very slight	Slight	Moderate	Moderate
New communities, guarantees	Slight	Slight	None	None	Very slight	Moderate
Open space land acquisition and development	None	None	None	Very slight	Very slight	Very slight
Public facility direct loans	Very slight	None	Very slight	None	None	None
Urban renewal grants	Very slight	Moderate	Slight	Moderate	None	Slight

Table 6.2 (CONTINUED)

Program	Inter-regional	Intraregional		Metropolitan		
		Metro-politan	Nonmetro-politan	Central City	Suburb	Satellite
Department of the Interior						
Waste treatment works construction	None	Moderate	Slight	Slight	Moderate	Heavy
Department of Transportation						
Federal aid airport program	Slight	Slight	Possible	Slight	Slight	Slight
Federal aid highway construction program	Heavy	Heavy	Slight	Moderate	Heavy	Heavy
Urban mass transportation grants	Possible	Heavy	Possible	Moderate	Heavy	Heavy
Small Business Administration						
Business loans, Section 7(a)	Very slight	Slight	None	Slight	Slight	Slight
Economic opportunity loans	None	Slight	None	Slight	Slight	Slight
Local development companies	None	None	Slight	Possible	None	Slight
Small business investment companies	Slight	Slight	Possible	Slight	Slight	Slight

SOURCE: U.S. Department of Commerce, *Federal Activities Affecting Location of Economic Activity*, Vol. II, Washington, D. C., 1971.

[a]For definitions of areas and effects, see footnotes to Table 6.3.

through their influence on capital costs, and by 3.6 percent for steel and 2.0 percent for paperboard through their influence on operating costs (Bosworth, 1976). There may also be differential effects according to the age of the equipment. Most cities have older capital than do suburban or nonmetropolitan areas.

Pollution abatement will have other, broader implications for economic development. Federal commitment to cleaning the nation's air and water could cost the average household nearly $300 per year (Tolley and Bonnel, 1972): Approximately one-half of this is for reduction of automobile emissions, a quarter for reducing pollution from stationary air sources, and a quarter for reduction of water pollution. These costs will be compensated for by such advantages as cleaner homes, better health, and more attractive beaches. Policies to reach these goals may have distinct urban and regional effects.

States are required to develop cleanup programs to reduce pollutant levels in Air Quality Control Regions to mandatory maximum levels. Densely populated areas will have to introduce more stringent measures to comply with standards, which may encourage the dispersion of economic activity. However, such control measures as residential heating fuel policies banning coal or high-sulfur oil may

Table 6.3

EFFECT OF SELECTED PROGRAMS[a] ON POPULATION, INVESTMENT, AND EMPLOYMENT IN METROPOLITAN AREAS

Program	Population	Impact on Investment	Employment
Small Business Investment Companies			
Central city	None	Moderate	Slight
Suburb	None	Moderate	Slight
Satellite	None	Slight	Slight
Business Loans, Sec. 7(a)			
Central city	Slight	Moderate	Slight
Suburb	None	Slight	Slight
Satellite	None	Slight	Slight
Urban Mass Transportation			
Central city	Slight	Heavy	Heavy
Suburb	Heavy	Heavy	Heavy
Satellite	Heavy	Heavy	Heavy
Federal Aid Highway Construction			
Central city	Moderate	Slight	Heavy
Suburb	Heavy	Heavy	Heavy
Satellite	Heavy	Heavy	Heavy
Federal Aid Airport Program			
Central city	None	Moderate	Slight
Suburb	None	Moderate	Slight
Satellite	None	Slight	Slight
Wastewater Treatment Works Construction			
Central city	Slight	Slight	Slight
Suburb	Moderate	Moderate	Moderate
Satellite	Heavy	Heavy	Heavy
Urban Renewal Project Grants			
Central city	Slight	Moderate to heavy	Slight to moderate
Suburb	None	None	None
Satellite	Very slight	Moderate	Slight
New Communities, guarantees and Supplemental Grants			
Central city	None	None	None
Suburb	Very slight	Very slight	Slight
Satellite	Moderate	Moderate	Moderate

Table 6.3 (CONTINUED)

Program	Population	Impact on Investment	Employment
Mortgage Insurance of 1-4 Family Homes			
Central city	Slight	Slight	None
Suburb	Moderate to heavy	Moderate	Moderate
Satellite	Moderate to heavy	Moderate	Moderate
Land Development and New Communities, Mortgage Insurance			
Central city	None	None	None
Suburb	Possible	Possible	Possible
Satellite	Possible	Possible	Possible
Interest Reduction Payments, Rental and Cooperative Housing for Lower Income Families			
Central city	Very slight	Slight	Slight
Suburb	Slight	Moderate	Slight to moderate
Satellite	Slight	Slight	Slight
Homeownership for Lower Income Families, Mortgage Subsidies			
Central city	Slight	Slight	None
Suburb	Slight	Slight	Slight
Satellite	Very slight	Very slight	Very slight
Basic Water and Sewer Facilities			
Central city	None	None	None
Suburb	Heavy	Moderate	Slight to moderate
Satellite	Moderate	Moderate	Slight to moderate
Health Facilities Construction and Modernization			
Central city	None	Slight	Very slight
Suburb	None	Moderate	Slight
Satellite	None	Possible	None
Public Works and Development Facilities			
Central city	None	Slight	Slight
Suburb	None	None	None
Satellite	None	None	None

SOURCE: U.S. Department of Commerce, *Federal Activities Affecting Location of Economic Activity*, Vol. II, Government Printing Office, Washington, D. C., 1970.

FOOTNOTES TO TABLE 6.3

[a]Definitions

Region: Both regions and divisions of regions are those used by the Census Bureau. Divisions of regions are named where they are used programmatically or where greater precision is gained by their use.

Metropolitan: Standard Metropolitan Statistical Areas (SMSAs) of all sizes.

Central City: The core of an SMSA, with minimum population of 50,000

Suburb: Surrounding urbanized, largely residential, typically unincorporated counties often eligible for federal assistance separately from central city.

Satellite: Focal points of economic development within the orbit of central cities, with identifiable concentrations of services and commercial activity; typically incorporated and eligible for federal assistance separately from adjacent suburbs.

Impact: Extent to which federal aid modifies the trends described below. Only impacts that skew the trends in a positive growth direction are indicated. A federal assistance program that accelerates an upward trend in population movement, flow of investment, or employment/income would be noted. For example, the trend toward population increases in suburbs is accelerated by assistance for residential water and sewer facilities.

Likewise, a federal assistance program that decelerates a downward trend is also noted. For example, urban renewal stimulates investment in central cities, despite a declining trend in these locations.

To keep the analysis manageable, negative growth impacts of federal programs are not treated by this study—i.e., program impacts that slow rising trends or intensify declining trends are judged to have no effect. For example, federal housing programs tend to assist population movement to suburbs.
This is not described as a negative impact on central city population.

In addition, impacts are assumed to be direct and occur within a reasonably short time from the distribution of assistance.

lead to benefits that exceed costs (Cohen, Fishelson, and Gardner, 1974). Environmental improvement may lead to lower wages as workers require less compensation for pollution health damage. This aspect of pollution control will benefit manufacturing cities relative to suburban areas and less polluted cities.

The effect that the control of industrial pollution may have upon the location of industry depends upon the manner in which the control is brought about and the flexibility of the industry with regard to the choice of location. There is some evidence that many heavily polluting industries are tied to locations near water—either for waterborne transportation or for the manufacturing process (Santini, 1975). They are therefore less able to move in response to increased local costs.

There are several approaches to the restriction of pollution. Emission standards can be set that are applicable to all plants in the nation. Standards can be based upon the level of output and the abatement technology available. With this approach, there would be no incentive for a plant to relocate. If there are stricter standards or higher emission charges in large cities, then there will be an incentive to relocate in smaller, less populated, and less polluted areas, leading to reduced employment in nuisance industries in large cities.

The net effect of pollution control on urban employment opportunities cannot

be predicted in advance. Although employment in some manufacturing industries may decline, other industries may be attracted by the cleaner environment.

Truck transportation may be affected by pollution abatement programs. Noise and air pollution emission control devices are likely to increase the cost of trucking relative to alternative transportation modes. Regulation in this area is likely to encourage employment growth in central cities. Similarly, the increased costs of automobile transportation ($150 per family per year) may slow down the movement of the population to the suburbs, where automobiles are used more intensively.

CONCLUSIONS

The federal influences on labor, transportation, energy, and capital are by no means exhaustive of the ways federal policies influence urban economic development. For example, the federal government exerts some influence over patterns of international trade, both through international agreements and through trade loans made available from the Import-Export Bank. Urban areas producing import substitutes will experience a decline in employment from an expansion of trade, areas producing exports will experience fairly rapid growth. New York City has been adversely affected by changing patterns of world trade because of its industrial composition.[18] Another possible example of federal influence is the tax treatment of entertainment expenses. This expense allowance may have led to the concentration of businesses that rely upon informal face-to-face interaction in large metropolitan areas. Alonso (1972 p. 645) concludes that

> although no studies appear to exist on the subject, this practice clearly underlies much of the glamour and the economy of certain metropolitan centers. Manhattan would not be the same without it, nor any other major metropolitan center. It may be presumed that, were these laws tightened, our socio-economic landscape would be grayer but more dispersed.

Although this may seem a minor feature, the importance of entertainment-related industries in large cities and the avidity with which cities attempt to attract conventions and tourists attest to the perceived emphasis attached to these aspects of the urban economy.

From the evidence presented in this section, it appears that the strongest federal influence on the supply of goods and services has been through transportation policies. Subsidies and regulation have encouraged the decentralization of employment. Labor market influences are also extensive, although how they influence urban development remains unclear. Energy policies have resulted in conceivable regional disparities in the cost and availability of energy, which has favored economic growth in the South. Finally, the federal funding of construction of economic infrastructure has encouraged expansion in growth areas at the expense of older cities.

[18] The Bureau of Labor Statistics identified seven 2-digit manufacturing industries in the United States as having been adversely affected by low-price foreign imports in the first six months of 1973. Domestic employment was reduced because of an increase in low-priced imports. Although 42.8 percent of the nation's nonagricultural labor force was employed in these industries, they accounted for 56.1 percent of New York City's workforce. In addition, the major growth in exports has been in technologically intensive manufactured products, expanding by 66.6 percent between 1967 and 1971. Nationally, 35 percent of manufacturing employment was in these five 2-digit industries; in New York City only 18 percent. New York City has therefore suffered because its comparative advantages compare more closely to those of the nation's trading partners than to those of the nation itself.

VII. OVERVIEW AND CONCLUSIONS

Summarizing the effects on urban economic development of the broad array of federal policies covered in the previous sections presents a number of difficulties. First, convincing evidence is hard to find. Second, studies have not assessed the relative importance of different federal programs nor how such policies may act together to create an effect that is greater than the sum of the parts. Finally, the process of economic growth and development is complex, and it is difficult to measure the relative contribution of development determining factors.

Federal economic development policy has not traditionally been viewed as an aggregate of numerous programs and policies. Rather, it has been viewed in terms of specific and often small programs, such as Small Business Administration loans, Economic Development Administration projects, and community development loans. A study by the U.S. Department of Commerce (1971, p. 12) pointed out that the "Departments of Health, Education and Welfare; Housing and Urban Development; and Labor characteristically have no economic development policies to which their programs can relate." Federal concern has traditionally been focused upon national economic growth, and less attention has been devoted to the distribution of that growth among areas within the United States. Although distressed areas were identified in the early 1960s, these were seen as rural areas left behind in the process of rapid urbanization, and the Area Redevelopment Administration and later the Economic Development Administration channelled development funds into rural counties suffering from chronic unemployment. The failure of many cities to benefit from the period of prolonged growth during the 1960s and the sharp decline in urban employment during the early 1970s have prompted a new look at the structure of federal policies and their effects on urban problems.

The influences of federal policies are very often the inadvertent results of actions aimed at solving specific economic and social ills. For example, freight transportation was regulated to protect users from some perceived concomitants of a competitive pricing structure and was not part of any coherent urban policy, and little attention has been paid to the urban effects. Research has tended to evaluate the effectiveness of policies in achieving their direct goals and not their indirect effects.

Data necessary to analyze many policies are often not available: The funds for many federal programs flow through state and local governments, and tracing where the funds end up is a difficult task. Economic census data are often inconsistent (see the appendix). The effects of federal programs and regulations can be assessed only if detailed information is available concerning economic development at a highly disaggregated geographical level. Such data are not collected.

The changing patterns of economic development discussed in this report are the result of a number of influences within which federal economic policies have played only a small role. Technological change and population movements have played decisive parts. Many federal policies that have created the strongest incentives for geographic changes are irreversible: Highways cannot easily be torn up, nor waterways filled in. This summary of the federal influences on economic development will identify those economic programs and policies that could, conceivably, be reversed

to benefit cities that have suffered from the inadvertent effects of past policies. This does not imply a judgment that such a reversal would be desirable. Rather, it is an attempt to identify the "degrees of freedom" the federal government has in designing and carrying out an urban policy.

This report has emphasized the shifts in economic development among three types of urban geographical units: urban areas in different regions, central cities and suburbs, and urban areas of different types. Tables 7.1 and 7.2 summarize the differential effects of federal policies among these geographical units.

REGIONAL SHIFTS

There is considerable disparity in urban employment growth rates among regions. Urban areas in regions with low growth rates have often experienced actual declines in employment. The Northeast and the Midwest have grown slowly since World War II; the South, the Mountain region, and the West have grown faster. The result has been a reduction in regional inequalities in the distribution of employment, per capita income, and the incidence of poverty. The Northeast and Midwest still lead the nation in the availability of employment opportunities and in median household income; smaller percentages of their populations are below the poverty level.

Technological Change

The increasing specialization in manufacturing has reduced the share of raw materials in total costs to such an extent that many firms are able to move away from sources of raw materials, particularly coal and iron ore, without incurring dramatic increases in costs. This process has allowed the decentralization of manufacturing away from the old manufacturing belt in the Northeast and Midwest. The increasing importance of truck transportation has allowed firms to locate away from established rail networks. The development of linear-flow plants, encouraged by the steady decline in real energy costs (until recently) and by industrial air conditioning, has led to the construction of modern manufacturing plants in the South.

Population Shifts[1]

Population movement toward the South and West has been paralleled by the movement of jobs. Population movements may have preceded job movements. The distribution of nonagricultural jobs among regions is closer to the distribution of population today than at any other time in this century. *Movements in population together with technological change probably explain the major part of interregional differences in economic growth.*

Nonreversible Federal Policies

Past federal actions that cannot be reversed have played some part in shaping interregional patterns of growth. The major policy in this category is federal con-

[1] The federal role in determining population movements is discussed in the *Population and Residential Location* report.

Table 7.1

FEDERAL POLICIES AND THE DEMAND FOR GOODS AND SERVICES

Federal Policy	Interregional Effects	Intraregional Effects	Effects by Type of Urban Area
Macroeconomic Policies:			
Aggregate monetary and fiscal policies	Northeast conforms more closely with national cycles, grows more slowly, and responds more volatilely than other regions to aggregate national changes	Central cities appear to be more cyclically volatile than suburbs and suffer recessions more deeply	Urban areas with high employment concentration in durable goods industries experience volatile employment fluctuations
			Large urban areas conform more closely to the nation than small ones
			Large cities tend to experience more rapid inflation than small ones
Automatic fiscal stabilizers	Unknown	Unknown	Unknown
Personal income tax changes	Favors high income regions	Favor high income suburbs	Unknown
Corporation income tax changes	Slight favor to growth regions	Unknown	Unknown
Investment tax credits	Favor growth regions	Favor growth suburb	Unknown
Public works programs	Favor growth regions	Favor suburbs	Unknown
Public employment programs	Unknown	Favor central cities	Program grants tend to be concentrated in large cities
Federal Spending and Purchasing			
Aggregate tax and expenditure patterns	Favor low income regions at the expense of the Northeast, tax receipts fall short of expenditures in growth regions	Expenditures tend to be concentrated in central cities	Unknown
Defense contracts	New England and Pacific areas have benefited from high federal expenditures	Unknown	Unknown
Defense salaries	Concentrated in the South and West	Unknown	Unknown
Sewage and water treatment facilities	Unknown	Have aided suburban development	Favor rapidly growing urban areas
Federal Transfer Payments	Stimulate redistribution from rich to poor regions; Northeast receives higher per capita welfare payments than elsewhere	May have aided in the concentration of poor households in central cities	Unknown
	Retirement payments have benefited the sunbelt		

Table 7.2

FEDERAL POLICIES AND THE PRICE AND AVAILABILITY OF FACTORS OF PRODUCTION

Federal Policy	Interregional Effects	Intraregional Effects	Effects by Type of Urban Area
Labor			
Income redistribution and taxes	Relatively high unemployment and welfare payments in the Northeast may have led to a relative reduction in labor force participation and higher unemployment in that region	Unknown	Unknown
Minimum wage	Unknown	May have led to increased unemployment in central cities in which affected labor is concentrated	Unknown
Unionization	High membership rate in Northeast has resulted in higher wages which may have slowed growth	Unknown	Unknown
OSHA	Affects regions according to industrial structure. Results unknown	Unknown	May affect older cities more severely
Manpower programs	Unknown	Tend to benefit central city labor force	Unknown
Transportation			
Regulation	Increase in freight rates has encouraged decentralization Rail based industries in Northeast have suffered with the rise of trucking	Rail based central city industries have suffered with the increase in trucking, which encourages suburbanization	Cross subsidy from large to small towns
Subsidies: Highways	Have favored growth regions at the expense of Northeast Subsidy in construction from North to South and Mountain area	Favor suburbs	Favor poorer, smaller towns at the expense of large towns
Waterways	Recent developments may have favored the South Have diverted tradeoffs from rail	Unknown	Cities served by waterway systems have benefited at the expense of railroad based cities
Mass transit	Unknown	May encourage suburbanization of population	Small cities receive higher per rider subsidy
Rail	May favor Northeast in the future	May favor central cities	May favor large cities
Air	Unknown	Airports usually constructed in suburbs	Cross subsidy from large to small cities

Table 7.2 (CONTINUED)

Federal Policy	Interregional Effects	Intraregional Effects	Effects by Type of Urban Area
Energy			
Regulation	Natural gas regulation has deprived the Northeast of gas supplies	Unknown	Unknown
Subsidies	Unknown	Unknown	Subsidies for rural electrification may encourage decentralization
Capital			
Tax structure	Unknown	Tax structure may have encouraged decentralization	Unknown
Regulation	Unknown	Pollution control may affect central cities more reversely	Pollution control may affect older cities more severely
Subsidies: Business loans	Unknown	May encourage central city investment	Unknown

struction of the interstate highway system. Although it represented very little net national subsidy, it has involved substantial interarea subsidies and has led to the construction of highways in the South and Mountain areas that would not have been carried out in the absence of the program. This has allowed firms relying on truck transportation to locate in these areas. The construction and operation of inland waterway systems has also encouraged development in those areas to which the systems have been extended, particularly in the South Central region.

Reversible Federal Policies

The most important interregional policy effects may be summarized as follows: Urban areas in the old manufacturing belt—including the New England, Middle Atlantic, and East North Central census divisions—are closely affected by changes in the national economy. This arises from the diversity of their economic bases and also from their concentration in cyclically volatile durable goods industries. The slow rate of growth in the national economy since 1970 has had a particularly severe effect on Northeastern cities. However, these areas are responsive to improvements in the national growth rate, and during any economic recovery they will tend to expand more rapidly than other areas.

Some monetary and fiscal stabilization instruments have failed to help this region. For example, investment tax credits benefit growth regions—the South and the West—where a disproportionately large share of the nation's investment is made. However, reductions in personal income tax rates favor the Northeast because of its high per capita income. The pattern of federal expenditure has also operated against the old manufacturing belt, which has received a much lower per capita volume of federal construction and defense expenditures than other areas.

Income redistribution programs have also transferred resources from the Northeast to the South. In view of the purpose of the program, this is hardly surprising. The Northeast has led the nation in federal disbursements per poor person, receiving almost double the allotment of the South Central division. This disparity has been matched by local governments in the Middle Atlantic area, which contribute almost five times as much per poor person as those in the South Central region.

There have been some distinct regional effects of policies that affect the price and availability of factors of production, although they are less important than the influence of the federal interstate highway system. Federal regulation of freight rates has stimulated the expansion of trucking at the expense of railroads, which has worked against the rail-based industries in the Northeast. It has also raised the average cost of transportation, particularly long haul transportation, which has encouraged firms to relocate nearer to their markets and accentuated regional decentralization.

The labor market has also been affected by federal policies. However, although the influences are probably extensive, they are complex and the ultimate outcomes are difficult to assess. Regional variations in unemployment insurance benefits and in welfare payments have probably led to an increase in the wages and a decline in the availability of unskilled labor in the Northeast where these benefits are highest. The high rate of unionization in the Northeast, encouraged, in part, by federal labor relations legislation, appears to have led to higher wages and may have encouraged firms to seek lower cost, nonunionized labor in the South. Unem-

ployment insurance coverage may have destabilized employment in the durable goods industries that experience considerable fluctuations in demand. These industries are concentrated in the Northeast.

Price regulation has sharply curtailed availability of natural gas to commercial users outside producing states. Energy costs in the Northeast are substantially above costs in other regions. Environmental protection legislation, manpower programs, inland waterway subsidies, and the business tax structure may have important regional implications, but the magnitude and the direction cannot be determined from data currently available. Regional shifts may be slowing. For example, regional differences in wages and productivity are narrowing and the interstate highway system is substantially completed. If regional disparities in growth rates are reduced, then disparities in urban growth rates will also lessen, since the growth rate of a region appears to be a major determinant of the rate of growth of the cities it contains. These are weak signs and far from compelling. If there is a slowing down in interregional shifts in economic development, central cities will have to adjust to what has happened rather than to reverse a continuing trend. Attention should be paid to measuring and monitoring paths of urban economic development in order to adapt policies to the underlying shifts.

In summary, rapid growth in areas outside the Northeast and Midwest appears to be the result of underlying social and economic changes, although augmented by a number of federal policies. The most important federal influence has been through the construction of national transportation networks, which cannot be reversed. Among federal policies that have exerted regional biases and that could be reversed if it were desired to assist in the economic recovery of the Northeast, the most important are the regulation of transportation rates and of energy prices.

CENTRAL CITY VERSUS SUBURB

Employment in suburban areas has grown faster than employment in central cities in all regions. Again, it is possible to identify a number of factors that have led to this trend.

Technological Change

The development of land-intensive, linear-flow plants and the growing importance of truck transportation have led a number of industries to favor a suburban location near convenient highway access. The increased reliance on the private automobile has allowed firms to move away from the central focuses of public transportation systems while continuing to attract an adequate workforce.

Population Shifts

There has been a dramatic increase in the share of the urban population located in suburban areas, particularly among higher income households *(Population and Residential Location)*. Federal policies have played a significant role in this process through subsidies to home ownership and highway construction. It appears that the growth of high income population in suburban areas has attracted firms seeking skilled labor.

Nonreversible Federal Policies

The construction of the interstate system has encouraged the suburbanization of both firms and population and has probably been the major federal influence on the process. In addition, a number of public construction programs, including water and waste treatment plants, have also favored suburban areas.

Reversible Federal Policies

Suburbs seem much less prone to cyclical fluctuations in employment than central cities. As a result, central cities have benefited from some stabilization policies. Unemployment insurance and public employment programs have been concentrated in central cities. However, countercyclical public works projects have probably been distributed in suburban areas. The direct benefits of temporary reductions in personal income tax rates have also been concentrated in suburbs where the average tax rate is higher.

In terms of policies that affect the price and availability of factors of production, transportation policies dominate in the process of suburbanization as they did for regional shifts. Commuters using automobiles have been able to move further from the city center. Increased traffic congestion may have encouraged firms to move away from the city center. The shift from rail to trucking, encouraged by federal regulatory and subsidy policies, has hastened this process.

A number of federal programs that have served to raise the cost of low-skilled workers relative to higher-skilled workers—including minimum wage legislation and welfare payments—may have increased emphasis on high skill production methods and thus encouraged a movement to suburbs where skilled workers are located.

The business tax structure may encourage firms to hold land for speculative reasons. Large lots suitable for this type of investment are more readily available at the suburban fringe than at the city center.

Finally, the quality of local public services and the level of local taxes may have played a role in encouraging the suburbanization of employment. There is little direct evidence, however. The local public sector appears to exert its influence primarily through residential location rather than directly on businesses.

TYPES OF URBAN AREAS

Less is known concerning the causes for different patterns of economic development by type of urban area. Large cities appear to have grown more slowly than smaller cities. New cities appear to have grown faster than older cities. However, these categories may be related to regional location rather than city type—large cities tend to be older cities located in the Northeast.

Technological Change

Older cities, particularly large, densely populated ones, have suffered with the decline of rail freight transportation since their spatial configuration makes it difficult for them to shift to truck transportation. Their manufacturing plants are ill-equipped for adaption to the land-intensive demands of modern plants; and

fragmentation of lots, high rents, and local government policies make it difficult to assemble appropriate sites in central cities.

Population Shifts

There has been a movement away from larger, older cities toward smaller and less densely population urban areas, perhaps in response to the quality of the environment, which may have driven up wages in older cities as workers demand compensation for the unpleasant aspects of urban living.

Federal Policies

Small areas have benefited at the expense of large areas in a number of ways: Public works projects—particularly sewage and water facilities—have been concentrated in rural areas; freight rate regulation has resulted in subsidies of rates for routes to small areas at the expense of more densely used routes to larger cities; federal subsidies have resulted in the construction of roads and airports in small areas where they would not otherwise have been built; rural electrification loans have reduced the cost of power; and mass transit grants per rider are larger for smaller cities. These effects have been identified. The development of a full taxonomy of urban impacts by type of area must await the results of future research.

A RESEARCH AGENDA

Perhaps the major finding of this report is that little is known concerning the effects of federal policies on urban economic development. The data necessary for analysis are simply not available. Data that are available are often inconsistent (see the appendix). Before meaningful analyses can be undertaken, relevant and reliable data must be assembled. Several desirable data sets may be identified.

Federal Expenditure Patterns

It is necessary to know where the federal disbursements go. The FY 1976 budget, in a special analysis, identified federal funds flowing toward SMSAs. Although that was a small step in the right direction, it yielded no information on city-suburban differences and no information on differences among cities. Clearly it is necessary to have such data for individual cities or on a county by county basis. The analysis summarized in Table 5.4 (Alonso, 1972) shows that this can be done, but this information must be available regularly and systematically. More disaggregation by type of federal spending is also desirable.

Urban Economic Development Data

Data are needed on the employment, output, and factor requirements of industries in cities, suburbs, and nonmetropolitan areas. The economic censuses provide some flawed data. Greater cooperation between the Departments of Labor and Commerce is required if the rich data bases they collect are to be coordinated and improved. The appendix lists a number of the most obvious flaws. The research of Kemper, Leone, and Struyk, discussed above, shows how the combination of pri-

vate and public data sources can provide insights into the process of industrial location.

Industry Surveys

It is difficult to assess, from the types of data presented in the economic censuses, how federal regulations will affect firms. One possibility that merits consideration would be to develop a systematic annual survey of a number of firms, comparable in scope and utility to household surveys. This would provide detailed cost information, would track locational behavior, and would allow the relative performance of firms in a given industry but in differing locations to be compared.

Factor Supply Data

Data on the cost and availability of productive factors in different locations should be available for a sample number of locations. The Bureau of Labor Statistics collects information on energy prices, the cost of living, and the wages of specific occupations in a sample number of cities. These should be augmented by data on the number of employees in each occupational category, the occupational mix in local industries, transportation costs, local interest rates, local taxes, and other data. This information could be collected in collaboration with the firm sample survey suggested above.

Other Research Studies

The relationship between both interregional and intraregional population movements and job movements must be explored in more detail. It is important to distinguish between the response of firms to changes in the distribution of demand and changes in the distribution of labor supply and to determine whether job movements tend to precede population shifts or vice versa. Solving this complex puzzle has important implications for a number of federal policies. For example, the justification for many manpower programs is that enhancing the quality and the quantity of the labor supply in a given location will attract jobs. Is this assumption valid? The types of jobs that may be attracted should shape the type of training programs offered. Yet we know little of this complex process. Regional development programs are predicated on the belief that by developing jobs at a given location, population may be attracted or retained. Yet if those jobs tend to follow rather than lead population movements, the efforts may be in vain. The analytic tools for this type of analysis are available. Models await calibration with more detailed and reliable data.

Further research is needed in the relationships among local tax rates, public services, and industrial development. The local public sector has expanded more rapidly than any other. Revenue sharing has increased the level of locally determined expenditures. Many federal programs are administered at the local level, including federal assistance in setting up local development corporations, yet little is understood about the relationship between the level and structure of local taxes and expenditures and local economic development. Many states and local governments have devoted considerable resources to attract industry: 45 states offer tax-free revenue bonds, 29 states offer other types of low-interest loans, 25 states

do not collect sales tax on newly purchased industrial equipment. Are these efforts futile? What is the appropriate role of local governments in the process of economic development? This research must await the availability of more detailed data.

The recent rapid escalation of energy prices and the massive federal commitment to energy research, development, and regulation require an understanding of the relationship between energy and economic development. What are the implications for urban areas? Very little is understood about the interarea economic effects of alternative energy policies. If unwanted effects are to be avoided, then research should be directed toward:

- How have differences in energy prices among areas affected investment in capital equipment, a complementary input? If energy prices are equalized among regions, how will the regional distribution of investment be affected?
- How will the demand for different modes of freight transportation change as a result of changes in fuel prices?
- How do energy and enviromental policies interact? For example, conversion from natural gas to coal may drive many firms out of central cities because they will not be able to comply with clear air regulations.

Very little is known concerning the determinants of investment and the role of the federal tax structure and regulatory policies. Fluctuations in the level of investment are an important contributor to aggregate cyclical fluctuations in the economy, and countercyclical programs frequently include measures designed to stimulate investment, although with mixed success. There have also been sharp differences in the role of investment among regions—slow growth areas have spent little on the construction of new facilities, resulting in an increasingly obsolescent capital stock. Three aspects of the investment process merit special attention.

- What effect do the federal and local tax structures have on investment decisions—the level and type of investment, and its spatial distribution?
- What effect do federal health, safety, and environmental regulations have on capital costs, and how do these effects differ among industries and among areas? Reports prepared by EPA and OSHA must be analyzed to determine the urban effects of these policies.
- The relationship between federally funded construction projects and private investment must be examined so that the disbursement of federal funds is done efficiently and equitably. Grants for the construction of water treatment facilities and roads are concentrated in suburban areas and have probably resulted in the movement of jobs out of central cities. Is that outcome desirable? How extensive is the effect?

The analytic tools described in Sec. III can provide help in answering these questions, if appropriate data are available.

Finally, the transportation sector must be analyzed and its influence on local economic development assessed. Two major changes in federal policy are underway, and their influence on urban economic development needs to be assessed: The regulation of freight rates is under review, and large federal subsidies for rail freight are being made. For these policies to be as effective as possible, the distribution of their effects among areas must be analyzed.

Appendix

DATA PROBLEMS IN THE ANALYSIS OF INDUSTRIAL DEVELOPMENT[1]

Data to analyze the process of industrial development must be available on the characteristics of industries, including level of sales, value added, energy consumption, transportation needs, and interindustry linkages. Knowledge of these industrial input factor requirements, as well as the performance of the industry, are critical to the assessment of the advantage to an industry in locating an area. Data must also be available for a considerable period of time to measure changes in an industry's performance and to identify possible lagged response to changes in economic conditions. The industrial data must be available for a large number of areas in the country to allow an estimation of the role of local characteristics and prices in the path of development. Finally, data on factor prices and factor endowments in each area are required in order to assess their importance to determining economic development.

No data base is available that meets all of these criteria and is still industry-specific at a detailed level of disaggregation (for example, the fourth digit of the Standard Industrial Classification). However, several different sources are available.

DATA TYPES AND SOURCES

Five sets of data are necessary for an effective analysis of industrial location: (1) data specific to each industry in each area in the nation, (2) data on the supply and demand industries linked to these industries and a measurement of these linkages, (3) data on industries' production requirements, (4) data on factor prices and availability at each location, and (5) data on the socioeconomic characteristics of the 30 selected SMSAs. A brief overview of some of the sources for these data is given below.

SMSA Industry-Specific Data

The first data group is available from the *Census of Manufactures, Wholesale and Retail Trade,* and *Selected Services.*[2] These are specific to a given industry in an area.[3] They include: number of establishments, number and payroll of all employees, number and payroll of production workers (for manufacturing only), value added (for manufacturing only), cost of materials (for manufacturing only), value

[1] This discussion is adapted from unpublished Rand research conducted by Georges Vernez, Richard Mudge, and Roger Vaughan for the New York City Economic Development Administration.

[2] Bureau of the Census, *Census of Manufactures, Census of Wholesale and Retail Trade,* and *Census of Selected Services,* U.S. Department of Commerce, Washington, D.C.

[3] These censuses publish data for the nation, for major regions and divisions, for states, for SMSAs, for some cities, and for some regions.

of shipments (for manufacturing only), value of sales (for wholesale only), and value of receipts (for selected services).

Interindustry Linkages

Because of the potential importance of industries that supply vital inputs to and purchase the output from any given industry, the level of output in supply and demand industries in an area is also important. The main sources for the identification of interindustry linkages at a detailed level of disaggregation are: *Input-Output Structure of the U.S. Economy: 1967, Volume 1*, U.S. Department of Commerce, Washington, D.C., 1974; and *1967 Input-Output Table of the Philadelphia Economy*. Industries in these tables are identified at the four-digit or three-digit SIC level of disaggregation. At a more aggregate level (two-digit or one-digit SIC level), interindustry linkages can be identified from the "Input-Output Table of the United States," *Survey of Current Business*, Vol. 54, No. 2, February 1974.

Industry Characteristics

Data on industry characteristics are usually available only at the national level and therefore do not vary between areas. Data that are available[4] include the share of the industry's total sales purchased by consumers (rather than by other industries); the labor intensity of the industry, defined as the dollar value of direct labor inputs per dollar of gross output; the transportation dependency, defined as the dollar value of direct transportation inputs per dollar of gross output; the fuel intensity, defined as the kilowatt-hours equivalent per dollar of value added; the value of fuels purchased per dollar of value added; the electric energy intensity, defined as the kilowatt hours per dollar of value added; and the value of electricity purchased per dollar of value added.

Factor Prices by Area

The local prices of factors can be expected to play a significant role in locational decisions. Indices of relative costs of different types of labor can be retrieved. A cost of living index for some areas is available, as well as the family income necessary to attain a medium standard of living. These data are published by the Bureau of Labor Statistics.[5]

Energy costs by SMSA are also available. These are: the cost of a monthly commercial fuel bill for consumption of 1500 kwh in 1970[6] and the costs and volume of energy consumed in manufacturing in 1971.[7]

Socioeconomic Data by Area

A broad range of socioeconomic data is available for areas as small as a block

[4] Sources are the input-output tables cited above, and the economic censuses.

[5] Bureau of Labor Statistics, *Handbook of Labor Statistics 1972*, U.S. Department of Labor, Washington, D.C., 1972.

[6] Bureau of the Census, *County and City Data Book 1972*, U.S. Department of Commerce, Washington, D.C., 1973.

[7] Both from Bureau of the Census, *Fuels and Electric Energy Consumed*, Special Report Series, MC72(SR)-65, U.S. Department of Commerce, Washington, D.C., 1974.

through the decennial *Censuses of Population and Housing*. These data are also aggregated to the county, SMSA, and state levels.[8] They include information on education, age, income, employment status, and family composition. Information for years between censuses is provided through the *Current Population Survey*. However, because of the small size of the sample (50,000), reliable projections cannot be made for areas whose population is far short of one million. A number of modeling attempts have been made at the county level.[9]

DATA LIMITATIONS

Several problems might be encountered in assembling and analyzing data of the type described above. Among the most constraining are: (1) incomplete coverage of industries both over time and across geographical areas, (2) changes between 1967 and 1972 in the types of establishments classified in SIC groups, (3) incompatibility between similar data series from different sources, (4) incomplete data on factor prices and earnings, and (5) change in area definition over time.

Incomplete Coverage

The three economic censuses—Manufactures, Wholesale and Retail Trade, and Selected Services—provide only partial coverage of industrial employment. Sectors not covered include construction (SICs 15, 16, and 17); transportation and public utilities (SICs 40-48); finance, insurance, and real estate (SICs 60-67); and some personal and business services (SICs 80-89).[10] This omission prevents any detailed analysis of industries in these areas. In addition, there are a number of apparent weaknesses and inconsistencies in data reporting. These are illustrated in the reference to the 1967 and 1972 Censuses below.

First, data on specific two, three, or four-digit SIC industries may be reported in one census but omitted from the next. For instance, in 1967 in the Buffalo SMSA, 31,700 workers were employed in SIC 37, transportation equipment. In 1972, SIC 37 was not even listed in Buffalo, although according to the Bureau of Labor Statistics there were 26,600 employees in this industry. In the Chicago SMSA in 1967 there was no mention of SIC 22, while the Chicago Standard Consolidated Area (SCA) was listed as having 3,900 people employed in this category. By 1972 the situation was reversed. The SCA had no listing, while the SMSA contained 2,600 employees in SIC 22. In Wisconsin, there was no listing of SIC 2645 in the statewide data in 1967, but the data for the Milwaukee SMSA showed employment in this SIC. These inconsistencies are obviously not due to disclosure problems (discussed below) but to uneven and inaccurate reporting and data compilation.

Data for specific four-digit codes may be reported while data for the corresponding three-digit codes to which they belong are not. Data for all four-digit SIC

[8] They have also been aggregated to functional economic areas (FEAs) as defined by the Office of Business Economics. See Richard J. Olson et al., *1972 County and City Data Book Cumulations to BEA Areas*, Oak Ridge National Laboratories, Tennessee, December 1974.

[9] See Peter A. Morrison, *Demographic Information for Cities: A Manual for Estimating and Projecting Local Population Characteristics*, The Rand Corporation, R-618-HUD, June 1971.

[10] According to the New York State Department of Commerce, these sectors accounted for nearly 40 percent of nongovernment employment in New York City, and would probably account for a similar share in most major urban areas.

industries but one in a three-digit SIC grouping may be reported, and data for the missing four-digit SIC industry must be retrieved through the laborious process of adding all the others within the class and subtracting from the class total. Another source of confusion is the use of a four-digit SIC code when the three-digit and four-digit codes are identical.

Restricted Disclosure

The Department of Commerce does not print data (other than the number of establishments) where to do so would disclose information on a single company. Unfortunately the disclosure rule is not applied uniformly in all areas. Of the 30 largest SMSAs and SCAs, Baltimore and Chicago suffered particularly from disclosure problems. In some cases, SICs with 70 or 80 establishments have disclosure restrictions. However, sometimes data for industries with only four or five establishments are fully reported. The case of the Chicago SMSA is particularly inexplicable since the SCA, which often includes only two or three more establishments (and sometimes none) than the SMSA in an industry, suffers hardly any disclosure problems. Clearly there is considerable local autonomy in the use of the disclosure restriction.

The necessity for restricting information except, perhaps, on capital investments and the value of shipments, is not at all clear. Much of the information, particularly for the large companies,[11] is available from alternative sources—annual reports to stockholders, other federal and state agencies, or from such commercial data companies as Dun and Bradstreet.

Changes in SIC Classifications

Between the 1963 and 1967 Censuses, and again, more extensively, between the 1967 and 1972 Censuses, the Department of Commerce changed the definitions of some of the four-digit and three-digit SIC groupings to such an extent that comparable two-digit codes from 1967 and 1972 cannot be reconstructed.

The goal of the reclassification was to ensure that each code more adequately encompass all those working in the described area. The cost is the inability to determine local, regional, and national trends over time. There was no attempt, for manufacturing, to publish two sets of data, one using 1967 codes and the other using 1972 codes.[12] Neither was there an attempt to publish lists of clusters of three-digit and four-digit SICs for which aggregate classification remained unchanged. To compound the problem, the Bureau of Labor Statistics continued to use a system of codes based upon (but not identical to) the 1967 Department of Commerce codes. The *County Business Patterns* also use the 1967 codes, so that comparability between sources is not possible.

Compatibility of Data Sources

The three major sources of disaggregated SIC employment data, the Bureau of Labor Statistics, the economic censuses, and *County Business Patterns*, are com-

[11] Dominant larger companies are presumably the reason for not disclosing data for industries with many establishments.

[12] This was done for the *1972 Census of Wholesale Trade*.

piled from surveys that vary greatly in their breadth of coverage, and therefore their accuracy. The most extensive of all are the censuses. There is no source by which the relative accuracy of each can be evaluated, nor can any attempt be made to use the censuses as benchmarks to adjust the other two. *County Business Patterns* and Bureau of Labor Statistics data cannot, therefore, be used to supplement a data file based upon the economic censuses.

Bureau of Labor Statistics Prices and Earnings Data

The dynamic behavior of industry over time and spatially is related to the local availability of factors. Information on the prices of factors is therefore an important input into industrial location analysis. The Consumer Price Index for a given SMSA at a given time is a useful measure of the relative cost of some materials and locally supplied services an industry faces. Time series price indexes are prepared by the Bureau of Labor Statistics for 23 SMSAs, with 1967 = 100 for each. Relative living costs *across* cities are prepared for 39 SMSAs for different hypothetical family living standards. There is not a complete "overlap" between the SMSAs covered, and therefore constructing a cross-sectional and time series data set for a wide range of SMSAs necessarily involves some regional approximations. A similar "double index" problem is present for wages and earnings, although the spatial and temporal coverage is much more complete.

Miscellaneous Problems

In addition to the major problems outlined above, a number of relatively minor problems complicate the process of data retrieval. Some SMSAs changed in definition over time. For example, Putnam (New York) and Bergen (New Jersey) counties were included in the New York SMSA for 1972, and Nassau and Suffolk counties were excluded. No attempt was made to publish two different tables of data using the old and new definitions, and since no disaggregated information is available for Putnam and Bergen in 1967, compatible employment data for the New York SMSA in 1967 and 1972 are not available.

County Business Patterns data are not aggregated across SMSAs, and any attempt to retrieve employment data from this source for SMSAs involves laborious summations.

The level of disaggregation in which BLS and economic census data are presented varies from SMSA to SMSA. The BLS data are further damaged by the extremely wide variations in the time periods for which data are available for different cities and SMSAs. For some the data reach back to the 1950s, for others they start in the late 1960s.

These data problems increase the diffficulty of assembling the data base from which a detailed analysis of industrial location might be effected.

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